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[OFFICIAL NOTICE.]

New England Association of Gas Engineers.

BIRMINGHAM, CONN., January 16, 1889.

The annual meeting of the New England Association of Gas Engineers will be held at Youngs' Hotel, Boston, on Wednesday and Thursday, February 20 and 21, 1889. The meeting will be called to order on Wednesday, at 10 o'clock A.M., by the President, Hon. A. M. Norton.

It can now be stated that seven papers have been definitely promised, and several others conditionally. From the character of the authors it can be safely guaranteed that the coming meeting will be a very interesting one, and that all who attend will be well repaid by the papers alone. It only remains for the members, by a full attendance and taking an active interest in the discussions, to make this meeting as successful, if not the most successful one in the history of the Association. The authors and subjects will be announced in the next issue of the JOURNAL.

Persons eligible for membership, either as active or associate members, and wishing to join the Association, will please send their names to the Secretary at once, who will immediately forward them blank forms of application.

Any member of the Association wishing to have any particular subject discussed will please notify the Secretary, who will in turn notify the members of the Association of the same, so as to enable all to come prepared to discuss the subjects more intelligently than otherwise would be possible. CHAS. H. NETTLETON, Secy.

[OFFICIAL NOTICE.]

Fifth Annual Meeting Ohio Gas Light Association.

OFFICE OF SECRETARY,
COLUMBUS, O., January 15, 1889.

To Members of the Ohio Gas Light Association: The Fifth Annual Meeting of this Association will be held at Mansfield, Ohio, March 20 and 21, 1889.

All members are urged to begin now to make arrangements for attending this meeting; and all persons eligible for membership, who have not already joined the Association, are earnestly invited to meet with us at Mansfield and become members. No live gas company in the State can afford not to be represented at the meetings of the Association; and if any company should fail to appreciate this fact, its active superintendent or manager, and, in fact, every man who expects to earn his daily bread in the gas industry, can afford to attend the meetings at his own expense. Our membership now numbers 125, and our meetings are well attended. While it is, as yet, too early to make any definite announcements as to the Mansfield meeting, preparations are progressing satisfactorily, and it no doubt will compare favorably with the meetings heretofore held.

On December 19, 1888, the Secretary issued a circular to each of the 125 members, inclosing a self-addressed and stamped envelope for reply, requesting volunteer papers for the forthcoming meeting. Up to the present time, I have received but 46 responses, only one of which contained even a conditional promise to furnish a paper. As the success of the meeting, of course, depends upon our having a sufficient number of papers, it is hoped that those members who have not yet responded will do so, and that those who have, will reconsider the matter, and that all who possibly can will volunteer papers before being "drafted" by the Executive Committee.

Several members are considerably in arrears with their dues. This may be owing, in some instances, to their desire to withdraw from the Association. If there be any such, I would be pleased to receive a written notice to that effect *at once*, as required by the Constitution, in order that the necessary action may be taken by the Executive Committee.

If any death has occurred in our membership since our last meeting, I would esteem it a favor to be so notified by any member having knowledge of the fact.

I shall be pleased to furnish any member, or person seeking to become a member, with a copy of our Constitution, on application.

Respectfully,

IRVIN BUTTERWORTH, *Secretary.*

BRIEFLY TOLD.

AN IMPORTANT PATENT DECISION.—Last Monday the United States Supreme Court rendered a decision in the long-pending case of the Bate Refrigerator Company *vs.* Hammond, which cannot fail to be far-reaching, if not radical, in some of its effects. In view of its importance we herewith present an account of the findings, the same being condensed from the *Tribune's* special Washington despatches in regard to the affair:

"The United States Supreme Court has rendered a decision in the famous patent case of the Bate Refrigerator Company against Hammond. The point involved was the effect which a foreign patent has on the duration of an American patent subsequently granted to the same inventor. American patents are granted for the term of 17 years, and section 4,887 of the Revised Statutes provides that the previous issue of a foreign patent for the same invention shall not invalidate the American patent, provided that the subsequent American patent shall be so limited as to expire with the foreign patent; or, if there are two or more foreign patents, with that one having the shortest term. In construing this section of the statute a complication arose early from the fact that many foreign countries grant patents for a short term of 1, 5 or 6 years, which terms may be extended on the payment of certain fees. The question was whether the American patent should expire at the end of the shorter term for which a foreign patent for the same invention was originally granted, or whether it should be extended with the possible extension of the foreign patent.

"The Circuit Courts have uniformly held that the American patent lapsed with the expiration of the foreign patent, and was unaffected by any possible extension of the latter. Thus, if John Smith took out a Canadian patent for 5 years, with the privilege of extending it to 10 or 15 years, on payment of fees, and subsequently took out an American patent, the lower courts have held that the American patent must expire absolutely at the end of the first 5 years, whether the Canadian patent was extended or not. Now the Supreme Court swings the pendulum to the other extreme by holding that the American patent shall run for 15 years absolutely, whether the Canadian patent is kept alive for that term or is permitted to lapse."

It is conceded that the decision will mix matters up greatly, and that while individuals may be vastly benefited, it is a grave question whether the benefit accruing to such will act even in the nature of a moiety-counterbalance to the hardships inflicted on others, who, accepting the universal dictum of the lower courts as the true interpretation of the statutes, have invested large sums of money on the basis of that faith. In fact, the condition of these investors only goes to prove anew that "faith without good works is dead." Among those who hailed the decision with much rejoicing was Mr. Edison, who it is said will now be able to collect tribute from every American manufacturer of incandescent electric lamps. However, as Mr. Edison is never backward in claiming everything, perhaps his (to say nothing of the ebullient nature of the "young blood" with which he delights to surround himself) enthusiasm in this instance may be on a par with that which led him a few years ago to predict that the doom of gas lighting was pronounced.

Since the promulgation of the decision, Mr. Edward N. Dickerson, one of our most expert and conservative patent lawyers of the metropolis, has placed himself on record, in respect thereto, in the following clear style:

"There were two questions involved in the litigation, of which the first and most important was not decided. That question arises out of these conditions. In this country an inventor applies for a patent, but on account of the delays in the office he may not get it for months or years. Meanwhile it may be patented abroad by himself or his assignees, then when his patent is issued in this country the question is whether its term is for 17 years, or for the unexpired term of the foreign patent which may remain after the date of the patent here; and that, possibly, may be but a very short term. There are patents in the office hung up by interference for 12 years or more while the foreign patents are running out, and if the American patent is to expire when they do it may be entirely defeated by them. In that situation it was argued that the statute which limits the American patent by the foreign one applies only to patents granted abroad before the date of the American application, and not before the date of the actual issue, and this ought to be the law; otherwise the American inventor either must give up the European patents entirely, or have his American patent cut down to a very short term, if he is kept in the office without his grants for a long time. This point does not seem to have been decided. The point that was decided is only important as applied to a number of existing cases in which, by ignorance, foreign patents were permitted to expire, or were taken for five years when they might have been taken for 15. No one will be likely to repeat that blunder, and so the decision on that point is not generally important. The case at issue was this—and Edison has many others like it—Bate took a patent in Canada for 5 years, which, according to their law, might be extended for 15, as a matter of right by simply paying the fees. That 5-year patent expired, and when his American patent for the same thing came to trial it was held that it had terminated by the expiring of the Canada patent. In that situation a statute was passed in Canada construing their law to mean that the 5-year patents were really 15-year patents when granted, subject, however, to being terminated in 5 years, at the will of the patentee, by not paying a fee. If that is true, then the American patent would not be affected by the default in Canada, because that patent is a 15-year patent, and our statute refers to the actual, original term of the foreign patent as a limit, and not to any possible forfeiture of that term. I do not know from the report so far whether the Court has rested its decision on that statute, or upon the broad ground that the Canadian patent is in law a 15-year patent, irrespective of that statute. If upon this latter ground, then it is applicable to all European patents in similar situation, as a general principle; if upon the statute of Canada, of course, it only affects such American patents as have been patented in Canada for 5 years."

A PLEASANT OCCASION AND GATHERING.—Perhaps no other resident of Montreal enjoys a more extended popularity or is better liked by those who know him than John McElroy, familiarly dubbed by his intimates as the veteran gas man. Still, time treads on, and although "Mac" is still strong and sturdy, the evidences multiply that he can no longer lay claim to be ranked as "one of the boys." When one can "point with pride" to no fewer than 10 grandchildren, juvenility must of necessity be relegated to the rear of the procession. Then, again, when one's friends assemble to celebrate the fiftieth anniversary of a wedded couple, juvenility's route is seen to be complete. In any event, the McElroy household was, less than a fortnight ago, the scene of a most enjoyable reunion, at which children and grandchildren of Mr. and Mrs. McElroy gathered to congratulate their parents on their arrival at that period where 50 years of harmonious life in double harness had been their golden portion. To accentuate the occasion, in consonance with the decrees of fashion, the smiling couple were presented with golden articles—Mr. McElroy being made the recipient of a handsomely mounted cane, while his other self may now peer out through massively rimmed golden spectacles. And here we may remark that the offerings were not those that would please juvenility. A charming feature of the reunion was the presence of all the younger branches of the third generation. The evening was then consumed in jollity and feasting. May the happy couple continue to enjoy to the end that peace which has been their previous portion.

SOME comment has been made of late, by those who desire that everything in which they have even a contingent interest shall be decided forthwith, on the seeming dilatoriness of the Massachusetts Gas Commission in relation to promulgating a decision on the various applications made to that body for the right to manufacture and distribute water gas, containing over 10 per cent. of carbonic oxide, in the Bay State. It will perhaps be remembered that we did not spare our condemnation of the Legislature that relegated this matter to the decision of the Commission; and, if we mistake not, our objection to that action was based on its cowardice. The Gas Commission was framed for the purpose of enforcing laws, not with the idea of determining whether the laws, as found, were good or bad. However, and to set at rest the minds of those who are unduly agitated over "the delay," we may say that a decision will be given before many days have passed. We might also further say that the care and minuteness with which the Commission has prosecuted its labors in the attempt to do equal justice to the conflicting interests are unequaled in the history of any other Board created for any specific purpose by any State. Moderation, impartiality and thoroughness have been the sole guides to the attainment of the verdict soon to be rendered.

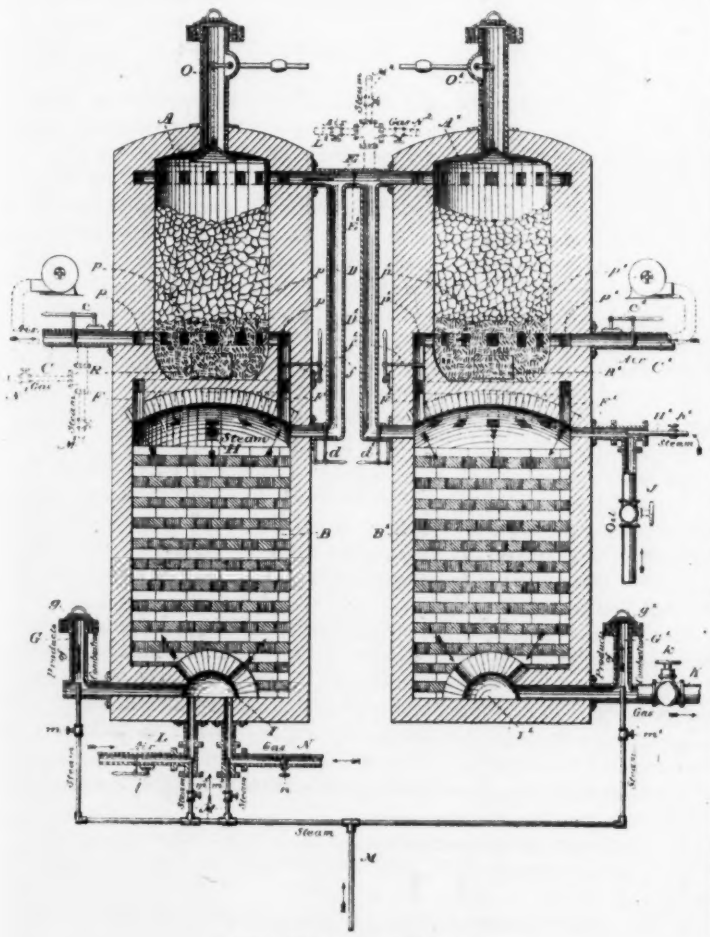
[Fourth Article.]

A Review of Patents Invented and Inventions Patented in the Gas Interest the Past Year.

By Frederic Egner.

Without special regard to the letters of reference on the face of the drawings, the apparatus patented by Mr. Rew may be briefly described as consisting of two generators, AA^1, over the two superheating chambers, BB^1, with the necessary air, steam, and gas valves and pipes. It is stated in the patents that the apparatus may be operated in several different ways.

Supposing the whole of the apparatus (Fig. 1) to have been brought to a working heat in very much the same way ordinarily employed in water gas apparatus, steam may be admitted at the bottom of (say, for example) B; passing upward it becomes highly heated, and enters A through channels F; passing through ports PP into and through the incandescent fuel, it is decomposed and passes out at the top of A,



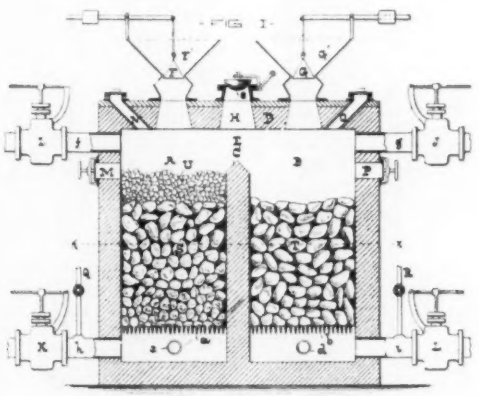
The Rew Apparatus.

through the passage plainly shown, over into A^1, thence down through the fuel in that chamber, through like ports, as seen in A, to B^1; down that chamber and out at I^1 and K.

An apparatus of this description has been erected for a trial at one of the stations of the Consolidated Gas Company, of New York city; and as the inventor is a man of independent fortune, and probably has the benefit of the advice of some of the New York engineers, it would be surprising if he did not succeed in producing a first-class gas apparatus.

The next illustration presents a sectional side elevation of a water gas apparatus and process patented by Mr. F. C. Kniese, at present Engineer of the Equitable Gas Company, Memphis, Tenn., and for many years superintendent of gas works at Baltimore and elsewhere. In the cut A and B are two generators, separated by the partition C. The grates are shown at a and b; the blast pipes at c and d; F^1 and G^1 are the fuel hoppers and valves through which bituminous coal is to be delivered into the generators. At H and e is shown, respectively, the main escape opening and valve; I, J, K and L are valves in the main gas pipes f, g, h *and* i, from which pipes the gas is to pass to the purifying apparatus; Q and R are steam pipes; N and O are stoke holes, with suitable caps, through which access may be had to the interior of the generators.

Supposing the generators to be charged with hot coke, and the gas valves closed and H e open, air is forced through both generators, until both are very hot. The air blast and main outlet are then closed and a



The Kniese Process and Apparatus.

charge of gas coal dropped into one of the generators—say F^1. Steam is then turned on at Q, and, valve J being opened, water gas is produced in A, which is to some degree carbureted by passing through the gas coal on top of the hot coke. The gas passes out at J. When the coke in the first generator is no longer hot enough to decompose the steam, the same is shut off at Q, valve J is closed and K opened, and steam tured on at R; and thus more water gas is made, which now passes out at K. When both generators are too much reduced in heat to decompose steam, the air blast is again turned on as at the beginning, and in due time the operation just described is repeated, only this time the coal is dropped into G^1.

We have never learned that this apparatus has ever been put in actual operation; but as the inventor is a thoroughly practical gas maker, it would lead one to regard his invention with a great deal of confidence.

Another patent, No. 376,944, shows a water gas apparatus, in the main constructed like the well-known "Lowe," but in addition it has a number of heating vessels, which are made hot by the waste gases, and the producer gas itself, coming from the generator, and through which vessels the air, steam and oil to be used must first pass, thus becoming heated before use by the otherwise wasted heat. Superheating the steam and pre-heating both air and oil for use in water gas generators is accomplished in a number of other apparatus, though not in the particular manner shown in the patent mentioned. No figures as to the true amount of economy effected by any of these devices can be given. The additional first cost and subsequent wear of the apparatus may fully balance the saving in fuel.

Patents Nos. 377.694 and 377,695 may be passed over without discussion, except to say that no doubt good gas can be made by the process described.

The same may be said of the "gas generator" described in patent No. 377,793. It is a resin (or rosin) gas apparatus.

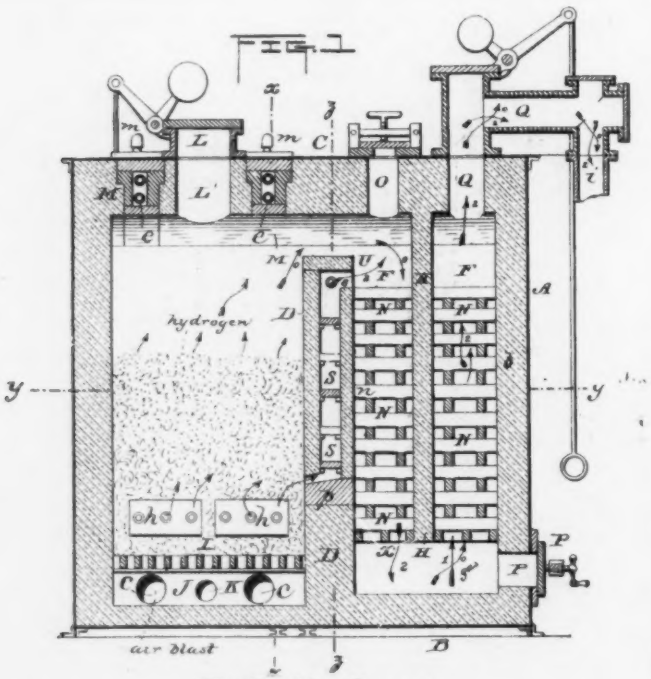
No. 378,095 is an apparatus for making water and coal gas—a sort of combination process. It looks well on paper; but the writer was informed that in Chicago, where it was tried, it had not yet come up to the full expectations of its promoters. We may hear more of it, however, as the inventor of the apparatus is an able gas engineer.

Patent 392,458, which will be illustrated hereafter, is something like the above in appearance.

Fig. 1 of the patent drawings of No. 378,490 is shown in the next cut (see p. 108). This apparatus has its fuel and fixing chambers contained in a shell of iron lined with firebrick. The ashpit J has cleaning doors c c and blast pipe K. This blast pipe is the only one shown, and if the apparatus is to be operated that way there must be great loss of fuel, as anyone conversant with the principles of combustion cannot fail to notice. I is the grate; h h are the openings into the fuel chamber of steam pipes, which are laid in channels that are built into the walls. The steam enters at m m at the top, and becomes superheated in its passage down through these flues to h.

The partition wall, D, is built hollow, so as to be able to hold retorts, S S, for carbonizing oil; these retorts are removable. F F are the fixing chambers; but, unlike the general form of these chambers, instead of being filled with checker-brick, fireclay shelves, not very unlike in

appearance to some forms of the "Coffey Still," are used to retard the too free flow of the gas. The main outlet is at *Q*. While this may be a good enough apparatus, we have seen a number of others which we



The Boeklen Process.

deem more economical, and like better to accomplish the desired results.

Patent No. 378,940 can be passed with the remark that it is simply *another way to make gas.* The furnace is placed *over* the retorts, and, in our state of ignorance, we cannot comprehend the advantage of the whole device.

Patents Nos. 382,371 to 383,375, inclusive, granted to A. G. Meeze, seem to be a series of patents where the same apparatus has been patented in every possible combination of the portions forming the original device. The object of the invention is stated to be "to improve the construction and arrangement of apparatus for the manufacture of fixed illuminating gas, and relates particularly to improvements in apparatus in which shale oil, petroleum, and fluid hydrocarbons of a kindred nature are, together with highly-heated water vapor or steam, injected into suitable retorts and dissociated at high temperatures."

Patent No. 300,803 (Fig. 3), granted to C. S. Salisbury in 1884, and No. 317,581 (Figs. 1 and 3), granted to same inventor in 1885, show almost the identical parts of the apparatus which are shown in Figs. 4, 5, and 6 of Patent No. 382,371 of the series previously mentioned. The Salisbury apparatus was operated at the Yonkers (N. Y.) gas works in 1883, and in our opinion was itself an infringement of the "Gwynne-Harris," "Allen and Harris," and some other patents—perhaps not so much as shown by the drawings and specifications, as in the actual manner of operating the same as seen by the writer. These patents were recently represented as in operation at the Municipal gas works, New York city, but whether that is correct or not the writer cannot say. The statement was made that the gas generated by means of the Meeze apparatus was mixed with water gas made in ordinary water gas generators, and thus a yield of 60,000 to 75,000 cubic feet per mouthpiece per diem was reached; but no statement as to the number of generators and retorts—relatively, we mean—was given.

It will also be observed that the combination of retorts and generators is not shown in the series of patents mentioned. The apparatus mentioned may be an excellent one, but the value of the patents, as such, does not seem, to the writer, to be great; for oil gas can be made in ordinary retorts, and the same mixed with generator water gas without infringing any patent whatever.

Patent 383,634 presents a coal gas retort, shaped like the letter N, laid on its right hand limb, thus: Ƶ. Coal would be charged into the lower branch in the usual manner, the gas having to pass up the diagonal limb and out at the left hand extremity of the upper one into the hydraulic main. No doubt more gas to the pound of coal could be obtained by this method, while it could be operated, but the practical reader will at once see obstacles which we will not insult his intelligence by mentioning.

No. 383,635 is for a washer and purifier, which is about the same as one devised by the late P. Munzinger; but which the latter did not patent, because, when tried on a pretty large scale, it would not work.

Patent No. 386,364 we may safely pass without discussion.

Patent No. 386,458 is a water gas apparatus with the well-known Springer distinguishing feature. In view of the Springer, and Pratt and Ryan patents, as well as known non-patented devices on the same order, the writer must say that while the apparatus referred to seems to be a good one, still it is so very much like some of those mentioned that he fails to discover the novelty of the invention.

(To be continued.)

Special Rates for Gas Consumed in Gas Engines.

The policy of establishing special rates for gas engine use has met with more or less criticism, doubt being expressed in some instances as to the equity of such a practice in respect to the consumer in general, while other objectors seem to fear that the tendency of such a reduction may incline the general consumer to insist on an extension of the rebate to those in his class.

With regard to the equity of the measure, it should not be forgotten, however, that gas sold during the hours of daylight is quite a different article of commerce from that disposed of in the hours when artificial illumination is a requisite for one's use and comfort; and not only does it so differ in application, but also in the item of its cost. Day gas need not be kept in store for use during a few hours of the night, for the former may for 10 continuous working hours be drawn from the mains immediately after its manufacture. Also, as main leakage can, under the circumstances of the different gas companies, be fairly regarded as a fixed and permanent quantity, its distribution is accomplished without added loss on that account. Accordingly, we have accomplished the day distribution at no other than ordinary storage and leakage charge.

Telegraph companies, whose bulk of business is in inverse hourly nature, have neither hesitated nor been debarred from accepting night messages for transmission at reduced rates, nor have electric companies been stopped from furnishing during daytime current for power purposes at less rate than that exacted for illumination. The attitude of the law making power, therefore, towards the matter of differential rates in these instances being well defined, the only points for gas companies to determine are whether it will pay and benefit them to make special prices for gas absorbed in the generation of power, and how great a reduction is warranted.

The gas companies of foreign countries, in which gas engines have obtained a readier and larger footing than with us, would naturally be possessed of valuable experience in the instance of the results of a fostering policy adapted to the favoring of gas power, and it was, therefore, determined, by parties interested in this subject, to forward the following list of questions to the leading German gas companies:

1. What is the price charged by your company for gas for illumination?
2. What is the price charged for gas used for gas engines?
3. What percentage of the total sale of gas is consumed in gas engines?
4. Does your experience prove the policy of favoring gas power, by means of special rates for gas, to be a good one; and has it added materially to the revenues of the company; or is it likely to do so in the future?
5. Did you experience any serious disadvantages traceable to this practice?
6. How many gas engines are in use in your district, and of how many horse power are the largest engines?

As the ruling German gas rates may be of general interest, we print below a list of these, giving the same in full in respect to the respective schedules for illuminating and power use. It may be said that the figures were obtained through the courtesy of those addressed, and that the originals, which were received in German currency values, and per cubic meter quantities, have been reduced to the American standard. It will be noted that the variation between the illumination and power schedules ranges from 20 to 47 per cent. Replies to question No. 3 could not always be given, as the accounts were not so kept as to cause the totals to be readily available; but the answers received show the amount to vary between 5 and 18 per cent.—10, 12 and 14 per cent. being probably the figures most frequently returned.

In the city of Mayence (population 70,000), having 66 engines in use—some of these ranging up to 30-horse power—the gas sold for power is placed at 18 per cent., and must necessarily be far greater in some of those cities from which figures in class 3 could not be obtained, but where

the number of engines averages greatly in excess of one to each 1,000 of population; as in the case of Nuremberg (population 100,000, with nearly 200 gas engines, some of 30-horse power); Fuerth (population 40,000, with 79 engines, including two of 30-horse power); Stuttgart (population 120,000, with 143 engines); Mannheim (population 70,000, with 80 engines); and Plauen (population 50,000, with 65 engines). Estimating proportionately, by above figures, in some of these cities the gas consumed must approximate closely 50 per cent. of the total output of the gas works.

The fourth question as to the advisability of special rates for gas power, was answered in the affirmative in every instance. Some of the replies are submitted:

"Since we adopted (1885) a reduction in favor of gas engine supply the number of these motors in use has risen from 24 (59-horse power) to 42, having 124-horse power.—*Offenbach.*"

"There is no doubt about the advisability of this policy.—*Crefield.*"

"The increased consumption is quite valuable, being exclusively during daytime.—*Bremen.*"

"Had but few gas engines before we adopted this plan.—*Barmen.*"

"The reduction brought us a decided increase in number of engines.—*Chemnitz.*"

"The gas consumption by engines has grown steadily from year to year, and will probably increase considerably more. The special rates for power have so acted in the past and will do so in the future.—*Augsburg.*"

"The steady increase of gas consumption proves that the measure resulted favorably for our Company.—*Dresden.*"

The sixth question (in respect to unfavorable results accruing from differential rates for gas) was given a negative reply throughout, not a single company making exception.

The correspondence (necessarily voluminous) connected with these inquiries disclosed incidentally the interesting fact that recently the Royal Provincial Government of Dusseldorf sent a communication to all the municipal gas companies of the district urging the establishment therein of special rates for gas for power purposes, as a means to support small industries and manufactures carried on in dwellings, and so save the people from being driven into the factories, and help widen the field for individual effort, thus assisting, even by indirection, in solving the social question now agitating Germany.

The document also sets forth the statement, based on reliable returns of facts and experiences furnished by gas companies, that gas for power can be sold at one-third the ordinary rate for illumination; and instances in support of this are cited from among the 33 gas companies situated in this municipal district, showing that 15 had already, and with success, established differential rates on gas for power. The city of Remscheid is shown to sell gas for illumination at 17 pfennigs, while 12 pf. is the power rate; Cologne, with 15 pf. as the usual rate, and 10 pf. as the power rate; Duisberg, with 12 pf. and 8 pf., respectively; Dusseldorf, 18 pf. and 12 pf. With regard to the latter town it is stated that the yearly gas consumption in gas engines, prior to the reduction, amounted to from 40,000 to 50,000 cubic meters only, while it rose in 1884–5 to 121,232 cubic meters, and in 1885–6 to 143,509 cubic meters.

The authorities also call attention to the benefits accruing to the towns from the increase in the number of small manufactures, resulting in the improved condition of independent working men or artisans, thus tending to increase the numbers of those in the ranks of the middle classes, so conducive to the lasting qualities of any community.

The recommendation of such measures by the slow-acting but ever-studious authorities of the German Government plainly shows that they at least pay no heed to the thought that has made so strong an impression on the policy of some American gas companies—the idea that special rates may prejudice them in the regard of the consumer in general; and the statistics given below must cause an extension of this verdict to the German gas companies in general, the proprietors whereof are content in the knowledge that a wise system of discriminative rates has neither involved them with their consumers as a class, nor interfered with their receipt of a legitimate profit. Indeed, quite to the contrary, in the latter regard. A public clamor in regard to the shrinking of gas rates in any department of supply to the lowest possible figure is not to be feared—at least where the maximum rate is a reasonable one; and it would seem to be, to say the least, super-sensitiveness to entertain such a belief in localities that have considered the public interest in consulting their own.

Some of our gas companies have instituted special rates for gas used in gas engines, and with good results, though the maximum rebate here has scarcely reached the 33 per cent. in vogue abroad; and consequently the larger sizes of gas engines were not as available in this country as in Germany, since our manufacturers would be called on to compete with steam under a decided disadvantage. In many of our cities the smaller sizes of gas engines—say, one-half up to four-horse power—cannot be surpassed in economy by either steam or electrical power, even at the current gas rates; but the installation of the larger sizes—25 to 50-horse power—is rendered almost impossible, as far as competition with steam is concerned, because of the high gas rates. Special rates would, it is fair to infer, place such sizes within reach of many of our industries, and undoubtedly cause the use of the smaller motors to become much more general. This leads to the remark that many of the electric motors now in use would be displaced by small gas engines; for while the latter are the more economical to work, still the ratio of economy is not sufficiently defined to induce the employer of power to purchase the gas engine, which, because of its construction, is a more expensive machine to build than is the electric motor.

Some gas companies seem disposed to grant a good rebate on the quantities taken up by the larger sizes of engines, in bidding for a business that could not be secured without that extra concession, while preferably

LIST SHOWING SPECIAL RATES OF GAS ALLOWED BY GERMAN GAS COMPANIES, AND NUMBER OF ENGINES IN USE.

City.	Population.	Price of Gas for		Percentage of Rebate.	Number of Engines in Use.	Largest Sizes in Use in Actual Horse Power.	Percentage of Total Consum't'n Used for Power.
		Illuminat'n	Power.				
Berlin..	1,300,000	$1.09	$ .87	20	669	1 of 60 1 of 50 1 of 40 / 9 of 30 7 of 25 12 of 20	
Hamburg	500,000	1.20	1.20	.....	232	1 of 25 2 of 20	
Dresden.	250,000	1.20*	.80	33⅓	197	1 of 25 2 of 16	10
Munich	250,000	1.60*	1.20	25	138	1 of 40 2 of 30 3 of 25	
Leipzic	180,000	1.33	1.00	33	121	2 of 40 1 of 30 2 of 25	
Cologne	160,000	1.00*	80–67 cts According	25–33 to quantity	165	1 of 30 1 of 25 – of 20	
Hannover	160,000	1.06*	.80	24	140	1 of 25 1 of 12 1 of 10	
Frankfurt a. M. ..	150,000	1.00	.80	20	98	2 of 50 2 of 20	
Magdebourg	130,000	1.20*	.93	22½	135	2 of 40 2 of 12	
Bremen	120,000	1.33	1.00	26	72	1 of 20 9 of 8	
Stuttgart.	120,000	1.06	1.06	.....	143	2 of 12 8 of 8	
Chemnitz.....	110,000	1.32	.87	34	115	2 of 20 2 of 12	
Dusseldorf.....	110,000	1.06*	.67	37	51	3 of 40 1 of 16	
Aix-la-Chapelle...	100,000	1.06	.80	24	58	1 of 20 2 of 12	
Barmen	100,000	1.18	.79	33⅓	156	2 of 10 2 of 8	8
Elberfeld.	100,000	1.06*	.80	24	70	3 of 12 2 of 8	
Nuremberg.....	100,000	1.32	1.00	23½	194	1 of 30 1 of 20	
Strassburg.....	100,000	1.32	1.06	20	43	1 of 16 2 of 8	
Crefeld.....	90,000	1.26	.67	47	78	1 of 16 1 of 12	
Brunswic	80,000	1.32	1.00	25	30	1 of 20 1 of 8	
Mayence.....	70,000	1.32	.90	32	66	2 of 30 1 of 12 1 of 10	18
Augsbourg	70,000	1.45	1.25	20	48	1 of 25 1 of 20	
Mannheim	70,000	1.32	1.06	20	80	3 of 60 2 of 12	
Erfurt.....	60,000	1.20	.80	33⅓	66	1 of 20 1 of 12	13.42
Karlsruhe	60,000	1.20	.80	33⅓	39	2 of 50 2 of 8	
Wurzburg.....	60,000	1.66	1.20	28	36	1 of 12	
Darmstadt.....	50,000	1.72*	1.20	30	34	3 of 8	
Plauen in V.....	50,000	1.20*	.80	33⅓	65	2 of 12 1 of 8	
Fuerth in Bavaria.	40,000	1.32	.....	.....	79	2 of 40 2 of 8	
Offenbach a. M....	40,000	1.32	1.08	20	42	1 of 25 1 of 8	12

* Subject to rebate according to consumption.

In above list 12 gas companies are found to abate between 30 and 47 per cent. of usual rates for power gas, 15 companies abating betweeen 20 and 30 per cent. Only two gas companies (Hamburg and Stuttgart) have one rate, and engines in use there are, in consequence, comparatively of small size only.

maintaining the higher or ordinary rate for the gas taken up by the smaller engines—4-horse power, or under; but we doubt the wisdom of the practice, for the smaller power engines, in the steam, electric or other class, would, because of their lower first cost, possess fewer attractions for purchasers, were it shown to them that they also might enjoy special rates for gas for power purposes.

This knowledge seems to have operated powerfully in respect of the consumers of gas in Germany, and the German gas companies have sensibly seen to it that the fact has been widely circulated. A similar practice should obtain in this country, in case the full benefit of such a measure is to be reaped.

(Continued from page 39.)

Gas Making in England Forty Years Ago.

By Geo. Anderson, C.E.

[The second of a series of articles in course of publication in the *Gas Engineers' Magazine*.]

Defeated in Parliament, as Col. Croll was, and no Limited Liability Act to fall back on, it would have been a fatal reverse with many people. Not so, however, to the brave Lion Croll—it only developed more of the man that was in him. The agitation in the city now became fierce and constant. The great difficulty was to calm the minds of capitalists and retain shareholders. Croll, to show his confidence, subscribed for, I think, 12,500 £10 shares. Pearson, by his legal acumen, produced a deed by which everyone supplying goods to the Company were bound not to look beyond the Company for payment, and this deed was registered and the "limited liability" clause of it was printed on all of the office paper, for it was determined to go on without the Act. Croll entered into an agreement with the Company that he would manufacture the gas and deliver it into the holders at 1s. 4½d. per 1,000 cubic feet, leaving the Company 2s. 7½d. to distribute it and pay dividend. The map of the city was cut up into about a score of sections, and three canvassers put into each district to canvass for consumers to take the gas for five years, provided they were supplied on the 29th of September of the following year. The reason why three canvassers were put into each section was that we employed the three parties in politics—the Tory, the Liberal, and the Radical—each canvasser calling only on his own party, and by these means we got 4,900 consumers, who signed contracts to take the Company's gas. Hence, with a contractor pledged to supply the gas at 1s. 4½d., and 4,900 people to burn it, the position of the Company looked prosperous. A piece of land was secured at Bow Common. Messrs. Joseph and Chas. Rigby, eminent contractors, undertook the entire construction, buildings, apparatus and mains, on a schedule of prices, so much a rod for brick work, and so much a ton for cast and wrought iron, and I became Croll's representative and clerk of works combined. I soon found that the contractor's interests and the Company's were opposed. The contractors were wealthy; they had experienced managers—they had, I think, agreed to take payment 25 per cent. in shares of the Company; so, altogether, they had great power. I was young and inexperienced, and so I found it difficult to combat propositions they made that would increase the cost for more yards of digging or more rods of brickwork, which meant more money, and the Company was very poor, for what it had to do. To give an instance, the contractors said the walls provided for the gasholder tanks were too thin—they should be a brick or 9 inches thicker. While Croll was present I had only to speak when I was spoken to, so I drank in the conversation about how treacherous the London clay was, what side force it exerted, even to driving the cross pieces through the upright timbers in a trench, how it swelled with water, and so on. I expected I would have to speak, and as I couldn't urge experience, I concluded I must fall back on logic; so when Mr. Croll said, "Well, Mr. Anderson, what do you think?" I said, "Well, Mr. Radford has had a large experience, but I think there must have been other causes at work to produce these results than the nature of the London clay, for if we were even to double the thickness of the walls they could not resist the force that drove cross pieces through timber uprights. Of course, our walls must be strutted in front, and I would rather that we added another half brick to the thickness of the walls if it would ease Mr. Radford's mind," and so it was arranged.

When we came to excavate for the tanks another difference arose, which meant a lot of money. The schedule was 1s. per yard for all earth dug and rammed, 2s. 6d. for all earth dug and carted away. I wanted them to dig a perpendicular trench of sufficient width to receive the wall and puddle, and provide struts to keep the earth from falling in; they, on the contrary, would dig with such a slope as the gravel and clay would stand at—this saved struts, but very much increased the quantity of digging. The first time Chas. Rigby came I spoke to him about it, but he, in the coolest manner, told me that they were not bound to dig in any particular manner, and this was their way. He was quite right—I was silenced, but I thought a great deal. In my verdant state I thought everyone should do their best for the Company, and finding it was not so, I began to think how I could circumvent him. I read 1s. per yard of earthwork filled in, 2s. 6d. for earth carted away. Hang it, I will not have any of it carted away. I will have it all filled in. I will not dig so deep as intended, but raise the top of the tank above the original level of the ground, and have all the earth returned behind the walls; and I calculated that by raising the top of the tanks 8 feet I could use up all of the excavated matter. I would therefore save 8 feet in depth of digging and the whole of the expensive carting. Of course, Croll was agreeable; and we must have saved some £1,000 in the construction of the four tanks, 104 feet diameter each.

We began the works in the month of March, and we supplied gas on the 29th of September, 1850. Such expedition I do not believe was ever performed before or since, for besides the works it included some three miles of 26-inch main to the city, and about 70 miles of pipe of all sizes, from 18-in. to 2-in., within the city, most of the pipe laying being done at night, so as to interfere as little as possible with the traffic. As one instance of expedition, we laid from London Bridge along Thames street to the Tower from 6 P.M. on Saturday, to Sunday morning, a distance of three-quarters of a mile. *Punch*, with his usual facetiousness, characterized the main laying as an invasion of the Picts and Scots, hitting off in one sentence the tools of the men and the country of the engineer.

About a month before the 29th of September—the day on which we must supply gas, or the whole of the 4,900 contracts with consumers would be broken—I saw it was highly improbable that the several parts of the apparatus could be completed, not through any physical impossibility, but because the contractors had no one in charge that was accustomed to such work—the laying of the underground connections to bring the whole of the several parts into one united whole were particularly behind, and Croll and I had some serious talk about it. I proposed that the only solution I saw was that the completion of the works be put into my hands, with power to buy anything wanted and to take on what men I wanted, and to have a horse and trap for my use. These powers were given to me next day. I at once went to London—had six complete sets of fitter's tools sent to Bow. Fitters that had been hanging about asking for a job were at once put on. Odd castings, branches, and the like that were not to hand I bought in London wherever I could find them—sometimes bringing one with me in my dog-cart, and for the next three weeks, Sunday and week-day, the work went on, sometimes all night, till the whole was complete. We started to make gas a couple of days before the 29th, and sent gas into the city that afternoon.

A few—a very few—of the consumers were supplied that night; but the gasholders ran down as if the whole city had been on. Sunday intervened, and allowed us to take breath. Huge leakages were discovered in numerous places in the mains. There had been generally from a dozen to sixteen gangs of men at work in the streets. When they came to a cross street where a branch had to be put in, the branch would sometimes not be at hand, and a space was left for it; in several instances these voids had been overlooked. In one case we found the end of an 8-inch main open, and, most wonderful, though hundreds of thousands of feet of gas had been thus blown into the city, we had not a single accident from fire or explosion thus far; and I may close this eventful part of my history with only a remark or two. I don't remember of a single accident to life or limb during the construction of the works. With the main laying I had no charge.

The manufacture and supply of gas of good quality was carried on uninterruptedly from the first, and we had no apologies to make to the public that our gas contained either ammonia or sulphur, for both those impurities were extracted by use of chloride of manganese and of lime. After the first three or four weeks the management of the works was put into the hands of the late David Methven, an excellent, cautious, and experienced Scotchman; and I went on with further extensions of the works, including more retorts, and two more gasholders to complete four standing in a square, and guide-framing of the whole bound together as they now exist. In the year 1851 we also laid a siding from the railway for the receipt of coal, continuing the railway right through the retort house at a height that enabled the railway trucks to discharge a ship load of coal in front of the retorts, and into said trucks the coke was loaded and sent away. I know of no works erected to this date more simple in design or better calculated to manufacture gas with economy. I had little or nothing to do with the manufacture after Mr. Methven took charge, but I know that the fuel account ranged from 12

to 20 per cent., and the system of purification was so economical that one man did the whole; he had only to empty the lime and chloride of manganese bags into their respective mixing vessels, turn on a supply of water, and move a lever through which engine power mixed the contents. In charging and discharging the purifiers he had only to open and shut six valves, when the purifiers discharged and charged themselves.

Writing now from recollection of statistics I took at the time, we purified 70,000 cubic feet of gas per bushel of lime. The chloride of manganese vessels, which preceded the lime vessels, absorbed not only the ammonia but also sulphuretted hydrogen. This proves that gas could be made cheaper then than it can now that gas companies are compelled largely to eliminate lime from the purification. I have heard talk of the cheapness at which gas can be made on account of improvements of late years. I would like to hear from some competent authority what those improvements are. I don't say that there have not been improvements; but there have been also hindrances to cheapness, and on the whole I say we could and did manufacture gas as cheap then as we do now. The chief reason why we can now sell gas cheaper than then is on account of the larger consumption, due mainly to lower price; and Mr. Croll proved this before Parliament, for from the same figures of cost he showed that gas should be sold at 4s., while the consumption was 368,000,000 cubic feet per annum, and pay 10 per cent. to the shareholders; it could with equal profit be sold at 3s. 6d. when the consumption doubled, or rose to 736,000,000 cubic feet. And all these prophecies of his have been since realized, for with consumption now far above these figures gas is sold at a little over and a little under 2s. per thousand, while shareholders are receiving even larger dividends than he proposed.

The success that attended the Great Central Gas Company in the city induced the consumers on the south side of the Thames to follow suit, and a company was started called the Surrey Consumers Gas Company. It commenced to supply gas at 4s., but owing to the engineer having utilized a chimney he found there, and laid the main flue from the retorts to it across the yard in a wet soil, he could not get draught to properly heat the retorts, and the supply of gas failed. The Directors of the Company saw Croll, when he spoke to me about it. I could tell him the cause, for I had been to the works and saw the state of the retorts, and guessed the cause of failure. The Directors and Croll came to an arrangement for the latter to take over the works—the former asked the engineer to resign, but he would not—the want of gas rendered them desperate, and it was resolved to take the works by force, which job was put into my hands. Knowing that the first thing to be done was to "get up the heats" by improvising a chimney, I had three vans loaded with twenty-four inch pipes, scaffold poles, ropes, blocks, some timber, and some men, and got to the gates of the Rotherhithe gas works about 7 P. M., on the 24th of December. Croll arrived with the chairman and some of the directors, and made a formal demand for entrance, but whether the engineer had "smelt a rat" or not, the demand made in all the tenses was refused. "Oh, let us break in the gates," said Harry Balfour, a young six foot Scottish engineer I thought well to take with me to see what fun there might be.

We heard that the stokers had been brought out to defend the gates, and there was talk of red-hot iron from the inside. The directors and Croll were talking of giving us possession if we could take it, when Balfour said, "Give me a leg up." I did. He was over in a second, the defenders had retired a few paces, for he unfastened the cross-bar in an instant while I was scrambling up the gate, and in we rushed, followed by the horses and vans. The stokers were all Irishmen, so I thought the first thing was to make a short speech. I mounted on something lying in the yard, and said, "Boys, we are not come to do you any harm, but to get you out of your trouble. Get in to your work, for we will begin at once to get up the heats and give you something like comfort this same Christmas Eve." "All right," they said; the engineer meantime had made some formal protests to his directors and to Croll and walked into his house, which was on the opposite side of the gateway to the retort house, and I into the retort house to begin operations.

I knew the main flue from the retorts ran along the floor just in front of the retorts. A sheer legs was erected there, men were sent up to make a hole through the roof, the ground was opened and a tile taken off the flue, a twenty-four inch pipe, twelve feet long, was placed over the hole and made good all round by fire bricks and clay, also brought with us; another two pipes were added, and by 12 P. M. we had an excellent chimney 36 feet high; the flue blocked off from the damp underground flue, and a roaring draught, which I let go on for the remainder of the night, reducing dampers next morning, and going home, for I was very tired, and taking Croll's house on the way to report. I should mention, however, that the engineer and I made it all up between *us* late that night. He could easily see what we were at; he knew equally well the torment he had for a couple of months with the coals only stewed in the retorts, and he could see that this temporary measure would make all the difference between misery and happiness.

So, in the "sma' hours" of Christmas morning he invited me in to supper, which I gladly accepted, and condoled with him, and said I would do what I could for him. What Croll's intentions were I know not. The whole thing had been done in absolute hurry. He might keep him on—they knew each other well—the mistake made was through a desire to save the company's pocket; it was only an unfortunate error of judgment in a single, though very fatal, instance, and might have been condoned; but as the result turned out he was sacrificed. He "set his back up," went to law, and closed the door against reconciliation. We now got plenty of gas; the solitary holder was 60 feet in diameter, and never before, I was told, had been up beyond four to five plates; in the next week we got the inner lift up to the cup, or nine plates high. The putting on of services, which had been stopped for a month previous, was now resumed with vigor—in a day or two we had the outer lift three to four plates out of water, rising rather out of level—next day we had it still higher, about six plates out. The directors were down to see how we got on, and while we were all standing looking at the holder, which they now saw so high for the first time—the outer lift disappeared from view, and landed in the tank, the gas it contained having all escaped. This was to me a crusher; for about a week we had been laying on a lot of consumers, and now I had no safe storage beyond the capacity of the inner lift. I prayed for the longer days to come, but they didn't come any the faster; so finding this not to answer, whenever we were very "short," I made a number of men get on the crown of the holder, and crush the contents out to the mains. This occurred generally between 11.30 and 12 P. M., after which the holder began to rise, when I got to bed and "slept soundly."

I may now say a word about the gasholder. It was set in a cast iron tank, mostly above ground; the foundations were soft, and it had sunk four inches out of level. The gasholder was guided on a new principle; the standards for guiding the inner lift were fastened on the cup of the outer lift, and terminated half way up, so that the top of the holder had no guide rollers or anything to bear against—this, with the tank, not forming a perpendicular path for the lower rollers. We found that it would uncup at any time when the outer lift was three or four plates up. I got over the difficulty by a system of an endless chain surrounding the tank, and passing up and down the dwarf columns over pulleys, and grasped by a number of arms fastened to the outer lift; and by this scheme I got the holder to rise and fall steadily throughout its entire height. But next year we raised the dwarf columns to the usual height, and guided the holder in the ordinary way.

(To be continued.)

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, Jan. 10, 1889.

The Gas Institute—Standards of Light—Gasholder Framing—Gas and Ventilation and Electric Light and no Ventilation.

The main topic of conversation in gas circles is the extraordinary position of affairs in connection with the Gas Institute. Within the last month the President and Secretary have resigned, and there has also been further secession from the Council, in addition to those which took place early in the autumn. The result is that out of an executive of twenty-five, only six remain in office. These six, fortunately for the Institute, are sufficiently public spirited not to allow private feelings or differences to interfere with the discharge of the trust they undertook in accepting the posts offered to them by the vote of the members. They have elected a President and an honorary Secretary *pro tem.*, Mr. George Garnett, of Ryde, having accepted the former, and Mr. W. Longworth, of Guildford, the latter office, and have employed an accountant to arrange the transfer of the property belonging to the Institute to their care. But for the energy and pluck shown by these gentlemen, we might possibly have witnessed the strange fancy which forms the chief feature of Coleridge's poem, "The Ancient Mariner," acted in sober fact. At last there would remain but one on the Committee, who would represent President, Secretary, Treasurer, and all, and have nothing left to do but to vote to his own use the handsome balance of accumulated funds. Fortunately this is not likely to happen, thanks to the determination of Mr. Garnett, Mr. Longworth, and the other members of the Committee, who have boldly faced a position of great difficulty and trial. Their endeavors will be ap-

preciated and supported by at least a respectable majority of the members.

The circumstances that have led to this strange and unfortunate state of affairs are for the most part matters of history. It will be remembered that at the last meeting the Council made an attempt to secure the expulsion of a gentleman who has persistently brought forward certain charges against gentlemen occupying official positions in the Institute, and that the vote was declared to be carried by the President. Since then the vote has been declared invalid in a court of law, and the President, or it would be more correct to say, the late President and Council, were condemned in costs, and had to submit to an injunction. Immediately on this decision being declared, a large number of the Committee retired *en bloc*, thus giving rise to difficulties which have, it is to be hoped, now reached a climax in the condition of affairs above indicated. Without entering upon the question of whether this un-Englishlike running away from duty is justifiable or not, it is possible to point out that the consequences are most disastrous to the welfare of the Institute. There is some talk amongst the seceders of promoting another Institute. Such may be established, but it will never be representative. If the existing Gas Institute falls to the ground, there will be an end to the possibility of promoting anything like a representative society for the gas industry in Great Britain. The fate of the Institute, and the possibility of similar unfortunate circumstances arising in connection with its successor, would undermine confidence in any central association. It is greatly to be regretted that the retiring officials could not see their way to consult the convenience of the members and the welfare of the Institute by retaining office until their successors had been elected. Evidently there is much behind the scenes.

It was my privilege to be present, a week or two since, at a meeting of the Society of Arts, where a paper was read by Mr. W. J. Dibdin, F.I.C., F.C.S., Superintendent Gas Examiner to the city of London, on "Standards of light." The views of this gentleman have already been published, and it is well known that he is in favor of adopting the Harcourt pentane system, in preference to the sperm candle, as the legal standard of light. He finds the amyl-acetate lamp fairly accurate, but objects to the color of the light yielded by it, and also finds that good practical results can be attained with the slit or screen system, as introduced by Fiddes, Methven, Sugg and others. On this occasion his paper was descriptive rather than controversial, and therefore did not arouse discussion on the general question of displacing the sperm candle. Specimens of the various proposed standards were exhibited on the platform. Hearing that these would be on view, the writer made a special effort to attend the lecture, being strongly imbued with the need for a reliable, cheap and portable standard of light, free from the occasional vagaries and capable of more rapid application than the candle. It is evident that the standard of light will always be subject to slight variation, and that there can be none of the rigidity attached to the pound weight and yard measure about it. There is a need, therefore, for a standard that shall be as nearly accurate as possible, regardless of all other considerations. If this can be united to the heterogeneous conditions of cheapness and portability, so much the better. If not, a standard that shall be cheap and portable, even at the sacrifice of one or two per cent. in regard to accuracy, is equally necessary. There are many persons who are anxious to study the science of photometry, but are unable to spend $500 or so in fitting up apparatus. In small gas undertakings, who, by their obligations are under penalty to supply gas of not less than a certain quality, the cost of a photometer, together with the fitting up of a room to accommodate it, is a serious business. Sometimes the apparatus for testing the gas costs as much as the bed of retorts for making it. An interesting fact brought out in the course of the paper was the attitude towards photometrical subjects at present taken up in German gas circles, where exhaustive experiments both with the candle and the amyl-acetate lamp are being carried on. This, taken in conjunction with the remarks made by Mr. Williams and Mr. Alexander Siemens in the course of the subsequent discussion, seems to show that the time honored candle is not yet to be thrown aside as a hopeless case, and also that there is some prospect in regard to the amyl-acetate lamp, which is as simple as an ordinary spirit lamp. It has been already observed that Mr. Dibdin obtained good results in point of accuracy, and some explanations were offered by Mr. Alexander Siemens as to the objectionable color. It appears that Mr. Dibdin was supplied with an early make, and that considerable improvements have since been effected. As a matter of fact, a certain amount of discretion must be exercised on the part of the operator with any kind of candle or lamp. Given a well made candle of known material, with carefully arranged wick, or a lamp supplied with a fluid of known composition, standard conditions being observed as to the wick in either case, a moderate experience will enable any careful operator to obtain practically accurate results. And it is difficult to conceive any kind of standard that will not call for some experience, skill and care on the part of the operator. Yet it appears to be the opinion in some quarters that the desired standard should above all things be capable of taking care of itself, and that the personality of the operator should be out of the question altogether. If a purely mechanical record is desired, it could best be afforded by the effect of the light on a radiometer on the electric conductivity of selenium, registered by automatic machinery.

Another candidate for honors in connection with the invention of improved gasholder framing has come forward. Mr. Jas. B. Terrace, of Brechin, has communicated a plan, comprising racks and spur wheels, to the *Journal of Gas Lighting*. In place of the usual columns and guides he would fix a convenient number of perpendicular racks, equidistant around the sides of the holder. A number of axles long enough to reach from one rack to the other are supported on suitable journals, preferably at a height of about 6 feet above the curb of the tank. Spur wheels near each end gear into two adjoining racks, and the racks are made broad enough to take two wheels. The two wheels on each rack are mounted on separate axles, one serving to connect (by means of another wheel) to the rack next adjoining on the right hand and the other on the left. Following this arrangement round the holder in the wind's-eye, it will readily be seen that the whole forms a system in which no one axle can rotate faster than another, and consequently the whole structure of the holder must always rise and fall in an exact perpendicular line. The racks would project a few feet above the top curb of the holder, and would terminate at a corresponding distance from the bottom. This is an invention that looks well on paper. The whole arrangement is above ground and easy of access in all parts. The structure is simple and admits of very delicate adjustment. The whole scheme offers promise of several practical conveniences in working, and it is evidently applicable to existing holders. It is to be hoped that it will at once be put to a practical test. It could be adapted to any holder without interfering with the existing columns, etc., and if not approved of could be taken away, leaving the original guide framing intact. One advantage offered by it is the facility afforded for varying the pressure given by the holder. Power applied to one of the axles would enable the weight of the holder to be partly or entirely counterbalanced on the one hand, or increased beyond the due on the other.

Mr. Vivian B. Lewes has addressed a remarkably sensible and clear-sighted letter, on the subject of the ventilating properties of coal gas as compared with the non-ventilating properties of the electric light, to the *Journal of Gas Lighting*. He points out that so much has been written and said as to the alleged salubrity of the electric light as compared with gas light as to lead the public to form the impression that having once fitted up the former, no attention to ventilation will be necessary. The electric light certainly produces no carbonic acid, nor does it absorb oxygen from the air; but on the other hand it does not tend to create air currents or assist ventilation in any way. It is a neutral. Gas is either a friend or an enemy, according to the manner in which it is used. It will either increase the foulness of the air, or maintain a regular supply of fresh air, as you may wish. Not only is this the case, but if used in overhead regenerative burners, it not only effects proper ventilation, but also yields double or threefold the lighting value that is afforded by ordinary fishtail or batwing burners. Yet it is strange, as remarked by Mr. Lewes, that gas suppliers are so apathetic as to allow such claims on behalf of the electric light to go unchallenged. The suggestion made by that gentleman to the effect that they should exert themselves in order to make known the ventilating properties of coal gas, is pertinent and opportune at the present time. It is one, moreover, that is easily carried out. Fit up the offices, or, better still, one or two of the principal stores or public rooms in the district with the best regenerotar burners, and a thoroughly efficient ventilating system. Enterprise in this respect might also be extended to gas fires, which are frequently rejected as costly or inefficient, because they are so fixed as to let all the heat go up the chimney, or else to let all the products of combustion come out in the room. There are difficulties about the ventilating problem. Practical experience will remove them in time. Apart from other considerations, it is well worth while to encourage inventors of improved burners, etc., and the best way of doing this is to place orders for their specialties, and thus stimulate them to further effort.

About a fortnight ago Mr. Hinman, State Inspector of Massachusetts gas, notified the Selectmen of Spencer that the gas furnished by the local Company had, upon three consecutive examinations, been found not to conform to the requirements of the statutes.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

SOME time ago we noted that the Massachusetts Gas Commission had listened to testimony in respect to the application of the Amherst Gas Company for permission to supply electricity for light and power purposes. The evidence did not materially differ from that presented heretofore at similar hearings, although the local Thomson-Houston branch made strenuous opposition to the grant. Mr. Wolcott Hamlin, who represented the electric company, conducted his cross-examination of Mr. H. F. Hill, President of the Amherst Gas Company, in a very skilful way, although we do not think that the former had the most remote idea of at least one result that would accrue from the drift of his questions. In order that our readers may have a clearer idea of the causes which led to the subsequent action of the Commissioners we place before them a summary of certain answers given by President Hill and Director Dickinson, of the Gas Company, to the queries of cross examiner Hamlin. President Hill having admitted that the original stock ($5,000) in the Company had been increased to $16,000, Mr. Dickinson followed with a more detailed statement of how this increase had been effected. Between the witnesses it was shown that the Company was organized in 1877, with a capital of $5,000, and no dividends were declared for three or four years. This deficiency, however, was made up by the payment of an initial dividend of 30 per cent., and a stock dividend of 100 per cent.—not a bad stroke of financiering. On the duplicate stock regularly declared semi-annual dividends of 4 per cent. were paid, up to 1888, when the capital was raised to $16,000, and a cash dividend of 50 per cent., representing undivided profits that had accumulated during the 11 years of business, was declared. Now, even the most conservative of financiers might be excused for hinting that the Amherst Company's stockholders were in a fair way to become surfeited from a too liberal indulgence in what is known as the investor's "melon," and also that the gas consumers of the town were in the way of losing their solidity, because of a too prolonged diet on the melon's skin. Perhaps a few samples of gas rates prevalent there will suffice to show how much the consumer is called on to pay for his supply of light. The "pure oil gas" fad is favored by the Company—*i. e.*, an oil gas, with an average illuminating power of 38.45 candles, the air dilution ranging between 5 and 8 per cent.—the gross price per 1,000 cubic feet being fixed at $6, payment within 10 days securing the following rebates—the discount being rated on the money value of the bill:

Value of Monthly Bill.	Discount.
$5.00	5 per cent.
10.00	10 " "
20.00	15 " "
50.00	20 " "
75.00	25 " "

During the year ended June 30, 1887, the Amherst Company's output —or quantity of gas paid for—was 773,793 cu. ft., and the average price received therefor was $5.39 per 1,000, which, excluding the town service, was taken up by 113 consumers, whose average consumption figures out at 6,472 cu. ft. per meter per annum. Now, let us see whether this high gas tax was shared by any extraordinarily large consumer of the product. The meter returns show that only 1 thirty-light instrument (maximum) is to be found in the town; again, there are 7 twenty-lights in use, while the number of 3-lights is shown to be 105. The gas was distributed through a mileage of pipes footing up at 3 miles 4,416 feet, graded in the following diameters and divided in the noted lengths:

Diameter, inches.	Length, feet.
1½	1,800
2	8,775
3	9,681

Take it all in all, the figures are at once amusing and suggestive, if not instructive, and fairly place the Amherst Company, in notable distinction to the balance of the Bay State gas companies, fairly in the category of corporations that, being penny wise are dollar foolish. The testimony adduced at the hearing on the proprietors' petition to be allowed to engage in electric lighting, added to the indisputable facts in respect to output, prices, adequacy of service, etc., already in possession of Commissioners, caused the latter to move in an official way towards exerting their authority under the statutes. When the hearing was declared closed—that is, as to the specific purpose which brought the Commissioners to Amherst—Chairman Coffin, after consulting with his colleagues, remarked that one of the duties imposed upon the Board was to hear complaints from patrons of gas and electric light companies, when the rates charged for either service were deemed excessive. He then bluntly added that the Amherst gas rates were too high, and informed President Hill that, on complaint of 20 of the Company's customers, the Board would forthwith order a reduction made in the schedule. Thus, the Amherst Company's greed, for by no other term may it be understandingly and justly defined, has finally led it into shoal water. In conclusion, we cannot but again revert to the competency of the Massachusetts Gas Commission, and to point to this last action of theirs as one well calculated to place them before the people of the Bay State in their true attitude of defenders of invested capital engaged in legitimate pursuit of the calling in which it is embarked, while at the same time acting as repellers of those in whose hands capital becomes a menace to the development of industrial progress.

SUPT. COWDERY informs us that the Jackson (Miss.) Gas Company is engaged in the work of installing an electric lighting plant of the Indianapolis Jenney Company's type. The local authorities have awarded to the Gas Company a contract (to last for 5 years) for maintaining 35 arc lights to be paid for at the rate of $110 per lamp per annum.

AT the annual meeting of the People's Gas Light Company, Manchester, N. H., the following officers were chosen: Directors, Messrs. W. L. Elkins and W. L. Elkins, Jr., of Philadelphia, and Jno. B. Varick, Jas. F. Briggs, Alonzo Elliott, Natt W. Ellis, and Frank Dowst, of Manchester; President, J. B. Varick; Vice-President, Frank Dowst; Treasurer, W. L. Elkins, Jr.; Clerk, N. W. Ellis.

THE death of Mr. McDonough, who was instrumental in organizing the company and prosecuting the construction work on the plant of the gas works at Ogden, Utah, has caused a queer hitch at this point. Perhaps we might better have said that it is the settlement of the McDonough estate that is responsible for the delay. When the McDonough interest in the Company was offered for sale, the same was supposed to have been disposed of to Mr. A. C. Swain, for the sum of $2,500. Shortly thereafter, or when the decree of sale was to have been vised in the local Probate Court, a California stockman, Mr. Rollin J. Saxe, who is said to be "very popular with the Mormon leaders," offered $3,500 for the interest, and, strange to say, the court "took the bid under advisement." Under our present knowledge, the action of the court would seem to be *ultra licitum*. In the meantime, Ogden has to get along without gas.

CUBA is still taking large quantities of American gas coke, several vessels having been recently chartered to take there freight of this description from Boston and Baltimore.

ON January 15th the Treasurer of the Consolidated Gas Company, New York city, forwarded a check to the State Treasurer amounting to $39,789.09, in payment of its tax on earnings, etc. A pretty good citizen; at any rate, a wealthy one.

AT the annual meeting of the Newport (R. I.) Gas Light Company, the following officers were chosen: President, Henry Bull; Secretary, Thos. A. Lawton; Treasurer, Andrew K. Quinn; Directors, Messrs. Henry Bull, Jas. C. Swan, Philip Rider, J. A. C. Stacy, Robt. S. Chace, W. H. Fludder and Thos. A. Lawton.

MR. LOUIS A. RUNGE, Inspector of Street Lamps, Minneapolis, Minn., in his last report to Council covering the operations of his department from July 1, 1887, to December 31, 1888, notes that the deductions made for inadequate service were as follows: Minnesota Brush Company, $2,206.47; Minneapolis Gas Light Company, $100.27; Northwestern Globe Gas Light Company, $126.45; Wheeler Reflector Company, $6.22; Sun Vapor, $4.72. The service rendered by the Minneapolis Gas Light Company is highly praised. In respect to the Minnesota Brush Company the Inspector says: "This Company has given the city miserable service, as will be seen from the return of unlighted lamps. Now it is open circuits, next, shortage of water to run with, then this and again that. I would recommend that the Committee on Gas see to it and not allow this Company to overload its circuits so as to decrease the general average candle power of the lights. With 64 lights on a 65-light machine, and the lamps spread over 5 to 7 miles of wire, the city does not get the light it is paying for—the contract calls for 2,000-candle power lamps. I have it from one of the best authorities on electricity that the Brush lamp, rated at 2,000-candle power, only yields 1,385 candles, with from 1 to 6 lamps on a circuit. How much lower would it be with 64 lamps on a circuit? As long as the city pays for 2,000-candle power it should have it, and can well afford to pay for the test. The service of the Northwestern Globe Company (naphtha lamps) is not as good as that of the others in its class. It is the same record that we have had of it for two years. This Company has 500 of the city lamps in use, which must be turned over to the city when the contracts expire in as good condition as when turned over to it."

THE movement towards gaseous fuel in Cincinnati is becoming more and more marked, that is, if the space devoted to its consideration in the supposed-to-be valuable columns of the daily newspapers is to be accepted as evidence. In the light of an explanation made to us by Capt. Ross, a few days ago, we are not now disposed to regard Mr. Tettenborn's remarks (printed in our last partially) as emanating from "one of the people," although we are not willing to recant a single syllable of what we said in praise of Mr. T's forcible argument. In fact, to put it boldly, Mr. Tettenborn is a seller of gas stoves, hence he ought, to say the least, to favor gaseous fuel to the last degree, and thus our present doubt that his remarks were based on a plane noted for its disinterestedness. Perhaps the following letter, from "Mary Hawthorn," may be another that was written not without the pale of interest (pecuniarily, we mean), but the "fragrance" of her argument, to say nothing of its pungency, impels us to submit a few of its sprays. Our persuader writes: "Unfortunate indeed is the woman whose home training has been so neglected that she is compelled to submit to the dictates of a servant, who is sometimes so slovenly, wasteful and extravagant that her very presence is an annoyance, and who, not infrequently, imperiously bows the mistress out of the kitchen with the assurance that she understands her business better, and can more satisfactorily cater to the husband's taste than can the wife. If you desire to perpetuate the love and retain the respect and confidence of your husband, relieve yourself at once of such thralldom by acquiring the knowledge which is essential to the perfect control and management of your own kitchen. To accomplish so desirable an object it is of the first importance that the household duties which the wife may be called upon to perform should be made as light and pleasant as possible. In the performance of such duties nothing is more prostrating or repulsive to the sensibilities of a refined and delicate woman than the drudgery entailed by the use of a soft coal stove or range, which requires the storage of fuel, the preparation of kindling, the carrying of coal, the removal of ashes, and the wear and tear of dust, smoke and dirt, all inseparably connected with the use of this relic of barbarism. Under the existing system of outside laundry work, if women can be relieved of the drudgery of cooking, little will be left of a laborious nature, and housekeeping, from being a burden, will be changed to a positive pleasure. Husbands, if you would make housekeeping easy, home more comfortable, children more cheerful and cleanly, living more economical and healthy, increase her self-respect, broaden the character, raise the spirits of your wife and make her independent of the petty tyranny of the autocrat of the range, buy her a gas stove, the comfort and convenience of which can only be thoroughly appreciated by those who have had experience in their adaptability to all the domestic requirements of any ordinary household." The "Hawthorne" puts the issue very neatly.

"THE annual meeting of the Brookline (Mass.) Gas Light Company was, as usual, a very harmonious and financially pleasing gathering. That self-possessed and thoroughly cultured gentleman, Doctor Robert Amory, presided, and it was he who presented the annual report. My informant (and I could hardly expect a different answer) refused to furnish me with a specific statement of the items going to make up the charges against the Company's electric lighting plant operation for the year under review, and so I must be content with giving you mere summaries. In the gas department the principal extraordinary expenditures were incurred in main extensions and renewals, the Beacon street district absorbing by far the larger proportion of the sums thus invested. The Company's main system is now returned at 54 miles, 1,580 feet. During the year the net increase in meters placed figures at 130, bringing the total to 1,549. The receipts from gas, etc., were $107,789.79, while the expenses are reported at $71,304.50, showing a balance of $36,485.29. The income from the electric lighting annex was $22,629.91, the charges against the same being $14,904.40, with a balance of $7,725.51. The dividends paid in the twelvemonth amounted in value to $27,000. Remembering your remarks anent the first gun of Secretary Nettleton, discharged in connection with the coming meeting of the Parent Association, the idea seized me that the representative of the Brookline Company in the Association could, were he clothed with authority to act, furnish a very interesting paper for his brethren, based on the working, in a practical way, of the Brookline electric lighting plant. At the outset, however, I remarked that Dr. Amory was self-possessed and thoroughly cultured, and to that I must add, as a reflex to my thought about the possibilities of a paper from Brookline on the subject named, that the Doctor is also exceedingly politic; so I fear that that particular paper need not be looked for. More's the pity. When the reports had been passed upon an election for Directors was entered into, with the following result: Directors, Messrs. R. Amory, W. H. Hill, F. H. Odiorne, F. W Lawrence and McPherson Le Moyne; Clerk and Treasurer, Francis W. Lawrence.—HADDAM."

ABOUT a fortnight ago Mr. Hobart presented the following resolution to the notice of the Board of Councilmen, Cleveland, Ohio (we submit it with the remark that it probably is intended merely to annoy the proprietors of the Company):

"*Whereas*, Section 6 of an ordinance passed April 2, 1867, granting certain rights and privileges to the Peoples Gas Light Company, provides 'That any time after the expiration of 20 years the City Council shall have the right and privilege of purchasing from said Peoples Gas Light Company, their assigns and successors, their pipes, buildings, fixtures, and other apparatus owned and used by them in providing the city of Cleveland with gas, at a fair price and compensation;' and

"*Whereas*, It may be deemed advisable and to the interest of the city that it should own and control its own gas works;

"*Resolved*, That the city consider the advisability of purchasing said gas works, as contemplated in said ordinance, with a view of extending the same throughout the city, and thereby take advantage of the large profits that inure from this industry."

Mr. Hobart's concluding lines may be said to be brutally frank.

IT is reported from Boston that the Bay State Gas Company has acquired possession of the plant and franchises of the Middleboro (Mass.) Gas Company.

THE Germantown Fuel Gas Company asks permission to construct works and lay and maintain pipes in the district of Philadelphia known as the 22d Ward.

SUPT. HARDING, of the Bridgeton (N. J.) Gas Company, not only represents a division of the town in the local Council, but also acts as Superintendent of the Second Presbyterian Sunday School. For the last 14 years Mr. H.'s labors in the latter field have been of the most devoted nature, and many a Bridgeton boy and girl trace to his teachings their knowledge of much that has guided them in safety over the snares set for youth. On the evening of the 16th inst. Mr. H. returned as usual to his home, only to find that his dwelling for the time was in charge of the Sunday School teachers and their and his scholars. The object of the gathering was in due course revealed when the teachers presented him with an elegant easy chair. A delightfully informal evening was then enjoyed.

THE bill introduced in the Ohio State Senate by Mr. Griffin, which authorizes the local authority to bond the city of Toledo in the sum of $750,000, for the establishment and maintenance of a natural gas plant, was considered on the 17th inst. Mr. Alexander made a strong argument against the measure, citing the fact that at least 45 per cent. of the total voting population, embracing perhaps 60 per cent. of the taxpaying total, opposed the measure, and further, that the citizens now, by rules governing the Council, could at the end of every twelvemonth regulate the rates at which natural gas was to be sold by the company already in the field. Mr. Rannells also spoke against the measure, and during his argument reviewed the present financial condition of Toledo. His figures showed that the current tax rate was now 2.80 per cent. on a high valuation, and that the bonded debt exceeded 10 per cent. of the total taxable property. Despite these and other good arguments the measure was adopted by a vote of 23 for to 11 against.

ON the 16th inst. the stockholders of the Montgomery (Ala.) Gas Light Company ordered the corporate name to be changed to the "Montgomery Light Company," and authorized the issue of $25,000 of 6 per cent. bonds, and an increased issue of stock, the proceeds to be devoted to the extension of the gas works and to the purchase of an electric lighting plant.

PROF. R. T. ELY, of the Johns Hopkins University, has been investigating the subject of the control and operation by municipalities of electric lighting plants, and his researches, which do not seem to have covered any wide territory, lead him to think that the plan is an excellent one; for, according to the Professor, such action is based "on greater economy and efficiency." So far as we can learn, the Professor jumps at this conclusion because in a letter received by him from Mayor Gray, of Painesville, Ohio, the latter states that the city plant—it cost $15,000, and has a maximum capacity of 90 arcs—supplies the public lights at a cost not exceeding 12 cents per light per night. Which is all very fine, and very economical, no doubt, if true. However, when we come to look into the figures, the grand total appears to be rather oddly figured out. For instance, money we suppose com-

mands 7 per cent. per annum in Ohio, and with that understanding the annual interest rental on the stated $15,000 amounts to $1,050, and charging this to the lights furnished alone gives us a daily allotment of 3.2 cents against each arc. We presume that an arc plant will virtually require renewal every 10 years, and when this depreciation is properly charged up the conviction is irresistibly forced upon one that labor, coal, superintendence, carbons, and other items must come pretty low out in Painesville. We would suggest that Prof. Ely address his next inquiry on this topic to the Mayor of Little Rock, Ark.

A REPORTER on the Brooklyn *Daily Eagle* has discovered that a ton of the bituminous coal carbonized by the Brooklyn companies yields from 22,000 to 25 000 cu. ft. of gas. Will Col. Benson, Col. Armington, or Mr. Cross be kind enough to say from what part of Long Island this coal is extracted; for its like certainly is not known to be mined in any other part of the world.

AT the annual election of the stockholders in the Syracuse (N.Y.) Gas Light Company, the retiring Board of Directors was re-elected. The Board thus consists of Messrs. A. A. Howlett, P. W. Forbes, D. P. and A. C. Wood, Chas. Andrews, G. F. Comstock, G. N. Kennedy, Thos. Molloy, B. S. Aldrich, J. J. Belden, and Frank Hiscock.

THE Common Council, Lawrence, Mass., has voted to "consider and investigate the contract made with the Edison Illuminating Company, in 1888, to light the streets at a stipulated price per annum." The inciting cause is inadequate service.

SUSAN RASSIN, impleading the St. Louis Gas, Fuel and Power Company, and the city of St. Louis as well, asks for $5,000 damages for injuries caused to her through having fallen into a trench opened by the Company at Eighteenth street and Clark avenue. Her injuries are in the nature of a permanent disability. It seems to us this is a case in that category about the cheapest way out of which is by means of private settlement.

ABOUT the most pronounced users of arc lights in this country are those who have manufactured or ready-made clothing to sell. For instance, the Bowery clothing merchant is a very small potato indeed who does not maintain at least two arc lamps in front of his premises; and as it is in "our own Bowery," so also seems it to be in like thoroughfares in other cities. Take the bustling city of Newark as an outside example. There every large clothing house seemed to vie with the other in procuring an electrical blaze. The most notable firms are: Marshall & Ball, Watson & Co., Stoutenburgh & Co., and Colyer & Co.; these named maintained a great total of arc lights, and would probably be doing so yet, were it not for the "Trust" agreement recently entered into between the hitherto competing electric companies, the latter being known respectively as the Newark Electric Light and Power Company (United States system), the Newark Schuyler Electric Light Company, and the Thomson-Houston Electric Light, Heat and Power Company. The competition between these forces brought rates to the point where the average commercial figures did not exceed $5 per month (2,000-candle power light burning till midnight), and this practice, it was openly conceded, brought loss instead of profit. When the "Trust" was formed the members agreed upon a schedule, the following being the main points thereof:

No. of Lamps.	Rate per Month, each.
12 and over	$7.00
5 up to 12	9.00
4	9.50
Less than 4	10.00

This increase was rather pronounced, and the first to object to it was the firm of Colyer & Co., who, on December 1st, ordered out all their interior lights. The lead thus instituted has been followed by all the other firms mentioned, save Watson & Co., although the remaining orders for discontinuance were not issued until the holiday season had terminated. In the meantime, Lungren and Wenham, and other types of improved gas burners, are having a boom in Newark, and Messrs. Vanderpool and Smalley are taking their way in that quiet so conducive to longevity. The electricians explain their action by the assertion that business without profit is not any longer their motto. And we might conclude with the remark that were it not for the theaters, the gin palaces and the clothiers, commercial electric arc lighting would be an industry only in name.

CHANGES AT NASHUA, N. H.—"I am sorry to have to say that a man who enjoyed the respect and affection of every New England gas man has, through what I may be allowed to designate 'the exigencies of the situation,' passed out of present active service in the ranks; but I am constrained to add that he will not be long out of occupation. For certainly every word that I have said will be indorsed by the co-laborers of William D. Cadwell, who for 15 years has been Treasurer of that sterling old corporation, the Nashua (N. H.) Gas Company—and the associate of such men as the Hon. A. M. Norton (President of the New England Association), Harrison Hobson—who, by the way, also goes by the board—and others. The cause of it all is appended in a few lines. The Nashua Electric Light Company, always an aggressive corporation, has been for some time back casting Jacob-like glances at its rival, the local Gas Company, and finally its Lochinvar style of courtship culminated, something less than a fortnight ago, in a meeting at the office in Murgatroyd's block. At this gathering control in the Gas Company was taken by the Electric Company, whereupon the resignations of Messrs. W. D. Cadwell, E. M. Shaw and Harrison Hobson were offered and accepted. The vacancies were filled by Messrs. J. W. White, F. W. Estabrook and Jas. H. Tolles, all of the Electric Company. Messrs. Edward Spaulding and Chas. H. Nutt represent the original gas interest. In the organization Mr. Estabrook was chosen President; Mr. Tolles was appointed Clerk, succeeding Mr. Hobson; and, let me exclaim with great joy, Mr. Alfred M. Norton was saved to us from the wreck. Still, they imposed upon him the additional duties of Treasurer in connection with the Superintendency. So all was not lost. The new management insist that the same liberal policy will obtain in the conduct of the gas division of the business; and as the gentlemen named are such in fame and fact, I doubt not that this will be so. In passing, let me say that the old management, beginning in 1876 with a gas rate of $3.80, reduced the schedule to its present grade of $1.40, and the stockholders never felt it either. —HADDAM."

WHAT ails the average citizen of Omaha, Neb.? He complained all through December that his gas was wretched, but evidently without reason; for Gas Inspector Gilbert's report for December shows the average power for that month to have been 6 candles in excess of the legal requirement. The Inspector also recommends the discontinuance of check burners in the public lamps.

AT the annual election of the Belleville (Ills.) Gas Light and Coke Company Messrs. Jno. and C. G. Eimer, Edward Abend, Adam Karr and Philip Schuck were elected a Board of Directors.

THE plant of the Edison Electric Lighting Company, for Brooklyn, N. Y., is to be erected on a plot of ground (75 by 100 ft.) situated on Pearl street, close to Myrtle avenue. The eastern side of Pearl street (and, for that matter, the property adjacent to this plot, to the south of it) is occupied by dwellings of a fairly good class, and it seems to us that the Company, bearing in mind Justice O'Brien's decision respecting the damage done to residential structures in the vicinity of the Harlem Lighting Company's plant, will be called on to pay substantial damages, once it is in running order.

MR. WHYTE, who pumped out the tanks in which once rested the holders of the Citizens Gas Light Company, Brooklyn, N. Y., reports that all three are unsound, one being in a decidedly bad condition.

THE appointment of Mr. P. B. Bate as Gas Inspector at Louisville, Ky., turns out to have been a disappointment to the local politicians. We are glad of it.

THE construction work on the water gas annex for the Philadelphia gas works (Twenty-Fifth Ward station) having been completed, a practical trial of its efficiency is now in order.

THE proprietors of the Conkling Manufacturing Company (Atlanta, Ga.) now heat their soldering irons by means of gas, and are greatly pleased. They report that at least twice as much work is accomplished with gas than was the case when coke was used. The company also operates a gas engine, and has thereby been enabled to dispense with the services of an experienced engineer, the money saving gained on this item alone being equivalent to $500 per annum.

AT a recent meeting of the Directors of the New Haven (Conn.) Electric Light Company, it was decided to increase the capital stock from $200,000 to $250,000. It is said that this Company earns and pays 8 per cent. per annum on its shares, and claims to supply current to 457 arc and 4,000 incandescent lamps—we are not aware of the prices charged for the service. A 200-horse power Babcock and Wilcox tubular boiler now being placed brings the total steam plant to 1,100-horse power.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Racine (Wis.) in Darkness.

OFFICE OF RACINE GAS LIGHT COMPANY,
RACINE WIS., Jan. 21, 1889.

To the Editor AMERICAN GAS LIGHT JOURNAL:

I enclose copy of a proposition for lighting this city, which I submitted to the Council. The city was lighted with 114 two thousand-candle power electric lights, 62 of which burned until midnight, the balance all night. The Thomson-Houston Company wanted $100 per year for each all-night light, and $75 per year for each half-night light. The City Council rejected both propositions, and the city is now in darkness.

I thought the figures might interest some of your readers, as showing the prices we are willing to take for light in the "Wild and woolly West;" for I myself have been deeply interested in the figures you published along back showing the relative prices paid for street lighting.

Respectfully yours, JOHN RODGERS.

(Copy of proposition submitted by Supt. Rodgers.)

RACINE, WIS., Jan. 7th, 1889.

L. H. COLEMAN, ESQ., City Clerk: Dear Sir—As per the enclosed advertisement for street lighting, I respectfully submit the following bid for street lighting: I will furnish gas to all the gas lamps now up in the 1st, 2d, 3d, 4th, 5th, 6th and 7th Wards, same quality and burner as formerly used (6 feet per hour), lamps to be lighted on all dark and cloudy nights, from dark to daylight, in the year, for $1.25 per 1,000 cubic feet; or $2 per post per month, to include everything. In connection with, and in addition thereto, will furnish all the Wards in the city with all the 2,000-candle power, double-carbon arc electric lights they require, to be lighted, same as the gas lamps, from dark to daylight, on all dark and cloudy nights in the year, for $50 each per year. Will guarantee to have the electric lights in the 1st, 2d and 4th Wards going inside of 90 days from signing of contract, and balance of the city within a reasonable time thereafter.

Will deduct 20 per cent. from the above prices if all the lights are extinguished at midnight.

This bid is on the understanding of one year contract, and contract to be same as present 1st Ward contract.

I enclose check for $150, as required. JOHN RODGERS, Supt.

Arc Lighting Experiences at Wilmington, N. C.

OFFICE OF THE WILMINGTON GAS LIGHT CO.,
WILMINGTON, N. C., Jan. 18, 1889.

To the Editor AMERICAN GAS LIGHT JOURNAL:

I mail you two copies of our local paper (the *Messenger*), which will give you some idea of how the electric lighting contractors (Thomson-Houston system) are complying with their contract in furnishing the light of the future. They agreed to light the city (when they "burn") with 50 arc lights, said to be of 2,000-candle power each—more or less—as the case may be; but, generally, in my opinion, less.

There had been complaint about the quality of the light, but during our holiday season—on and about New Years—the city, east of Third street, was in absolute darkness for 4 or 5 nights. They said that "something was the matter with the dynamos," which is quite likely. This "something" could not have happened at a more inconvenient time, and the community was much provoked; the greatest numbers of the residents have occasion to use the streets at night during this season of the year.

While the moon was not "full," yet that luminary would have been quite a desirable companion not alone to those who were not "full," but also to others who may have been "full" or "half filled." It is generally stylish at this season to "get full on the sly," and everybody had the opportunity, for the electric light was out, and night had no eyes.

Well, again, and lately, something has been the matter, with consequent complaints for light. Whether the electricians had, for the year just closed, made an inventory or balanced their profit and loss account, I know not, but they are evidently making an effort to economize the light, which, you know, will reduce their running expenses. Still, from the papers sent you, you will note that serious complaint is made to their service. I send them to you as information for those who believe that gas companies ought to operate electric lighting plants in connection with their gas plants. I am not as yet a convert to that doctrine, but believe that a gas company should make every effort to reduce its selling rate. It will then be kept busy. Let the electric light be a competitor—and I think it will also then act as a protection to us from opposition gas companies. Yours, etc., JNO. W. REILLY, Supt.

[We append the newspaper comments forwarded by Supt. Reilly:]

"*Egyptian Night.*—Yesterday (Jan. 16) was dark. The canopy of heaven was cloaked in garments of sable hue and sun-obscuring density. The night came on with little or no promise of a lifting curtain, and heavy shadows hung, like a pall, over this municipality. Saving a few glimmering spurts from electric light globes at prominent places of business that demand such indulgence through the gloaming hours of evening, and stickle for their continuance into at least one of the shelving hours of those that point to another dawn, there were no softly radiating globes in this city last night to light the wayfarer or direct the late homeward bound footsteps of the tax-paying citizen. Utter, appalling and soul-rasping darkness reigned. The night was barren even of the lunar-favored excuse that has made plausible similar derelictions on the part of our electric lighters. What is the matter? The citizens are anxious to know, and so is the *Messenger*."

"*The Lights all Burning.*—Last night (Jan. 17), notwithstanding the heavy moisture in the atmosphere, caused by a drizzling rain, the electric lights shone clear and bright throughout the city. Yesterday afternoon, in a chat with the President of the Wilmington Electric Lighting Company, Mr. H. A. Burr, that gentleman said: 'This Company has conscientiously endeavored to fulfill its contract in the spirit in which it was made as a matter paramount to pecuniary considerations. It has given, so far as we know, a service which has placed it outside the boundary of comment until the week prior to January, when from unavoidable causes one of the dynamos became disabled, and the damaged part was replaced at as early a day as was within our power. The contract between the city and this Company is based on what is known as the Philadelphia moon table, and is not on all night and every night service. It is in this respect similar to the contract under which the Gas Company operated the municipal lighting for years. In order that our dealings with the question of the sufficiency of light (during the non-lighting hours) should have the approval of the city authorities, it was, by our desire, that the Chief of Police, or his constituted deputy, should notify our station when, in his opinion, the light should be turned on, and we would hold ourselves in readiness to carry out his wishes at a few moment's notice. It is our desire not only to give the citizens a full equivalent for their money, but, as far as we can, giving them the best light, and in the best way we know how, to render every citizen our firm friend; we appreciate that only by this consideration for their wants can we render ourselves not only useful, but necessary to their comfort.'"

German Artificial Colors.

Germany is the great center for the manufacture of artificial colors. From official returns *Kuhlow's Review* learns that in 1886 there was imported into the German Empire 65,444 kilogrammes of coal tar colors, while the exportation of the same class of colors amounted to the considerable total of 5,700,000 kilogrammes. Eighty per cent. of the coloring matters used in Germany by dyers are of native manufacture. Switzerland also manufactures colors and consumes them. The importation into Switzerland in 1886 was of the value of 1,609,600 francs, while the value of exported colors was about four times as great—that is, 6,925,586 francs. An olive color of a greenish shade, to work with black outline with any fancy color for ground, is given in the *Leipziger Farber-Zeitung*. The basis is cerulein, and the color is fast to light, air, soap, and to a considerable degree also to chlorine. The color is made by taking 4 pounds of thickening, 2½ of cerulein, and ½ pound of acetate of chromium at 30° T. The cloth is preferably prepared with oleine, the goods are steamed, passed through hot chalk and water, washed and soaped for 30 minutes at 150° F.

From the same journal may be quoted what is called a fast monument green for cotton yarns. For 25-pound cotton the goods are mordanted cold with 25-pounds of nitrate of iron, and then well washed; next prepared with tannic acid and antimony in the usual way. The dye bath is composed of 7½ pounds good soap, 2½ pounds methylene blue, B, and 1½ pound auramine, O. These materials are got into solution, and the dyeing commenced cold, the liquor then gradually heated up to near the boiling point, but not to actual boil.

The goods are again washed, whizzed, and again dyed at a temperature of 170° in 20 lbs. prepared catechu liquor and 2½ lbs. sulphate of copper; a second bath, also at 170° F., contains 5 lbs. bichromate of potash; the goods after the catechu are passed into the chrome and then back again into the catechu, and again into the chrome as in dyeing brown. After washing, the goods may be softened in a soap or oil emulsion bath, and finally dried. This is a very dark, heavy green, but why called "monument" it is difficult to say, unless that it has a resemblance to the dark green sometimes seen on bronze statuary.

A blue color made by Casella & Co. has received the name of Indazin. Acetin is recommended as a suitable solvent, but it is said that acetic acid dissolves it equally well. It is fixed upon cotton by means of tannic and antimony salt.

The Market for Gas Securities.

During the week Consolidated was "marked down" to 80, but the lowest *bona fide* transactions were effected between 81 and 82¾. To-day (Friday) 82 is bid, with no stock offering. It is well understood now by investors that the bear balderdash that has been printed of late in a certain evening newspaper is founded on spleen and disappointment. Other city shares are weaker. We note a sale at auction of 45 shares Equitable, at 112. Brooklyn shares show no marked change, Citizens, however, being disposed to recover steadily. Mr. C. W. Barron (and he is in position to know) asserts positively that the *control* of the old Boston Company is now vested in the Bay State Company. Some arrangement has probably been entered into, but that it provides for total surrender we do not believe. Elsewhere is mentioned something about a State bill that empowers the Toledo (O.) municipality to bond the city in the sum of $750,000, the proceeds to be devoted to the establishment and maintenance of a natural gas plant. The bill as eventually passed provides that the project shall be indorsed by 60 per cent. of the voters of Toledo, the balloting to be taken in the spring. Cincinnati shares are up to 193. A recent quotation for Buffalo (N. Y.) Mutual is 94 to 98. Chicago Trusts are at 35¾ to 36½. In bonds we note the following: Equitable Gas Light and Fuel Company, Chicago, firsts (6 per cent.), at 93 bid; Chicago Gas Light and Coke Company, firsts, guaranteed 5's, 83 asked Williamsburgh, 110 to 112.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks.

16 Wall St., New York City.

January 28.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	82	82½
Central	466,000	50	—	—
" Scrip	220,000	—	47	57
Equitable	2,000,000	100	112	116
" Bonds	1,000,000	—	113	115
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	115	118
Mutual	3,500,000	100	96	99
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern	125,000	50	30	—
" Scrip	108,000			
Yonkers		50	90	100
Richmond Co., S. I.	300,000	50	55	60
" Bonds	12,000	—	—	—

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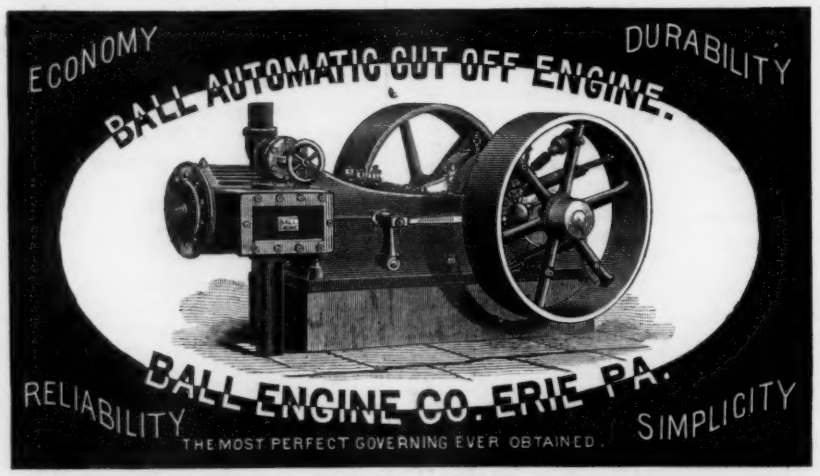

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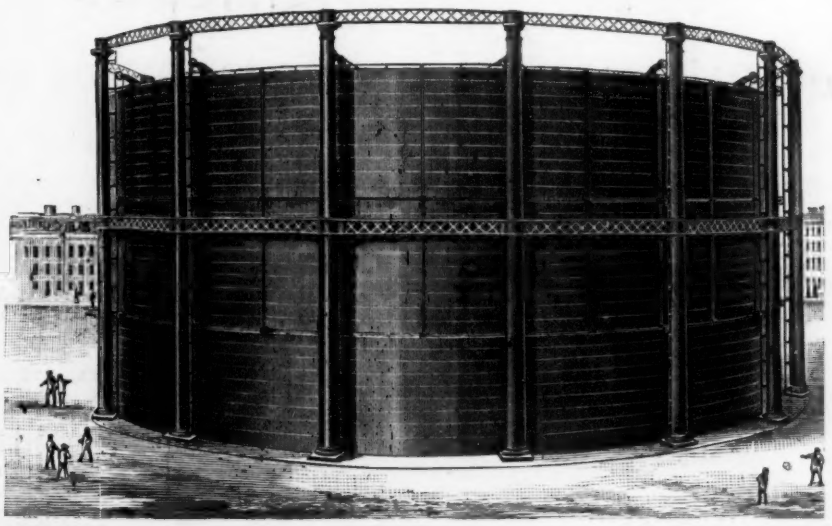

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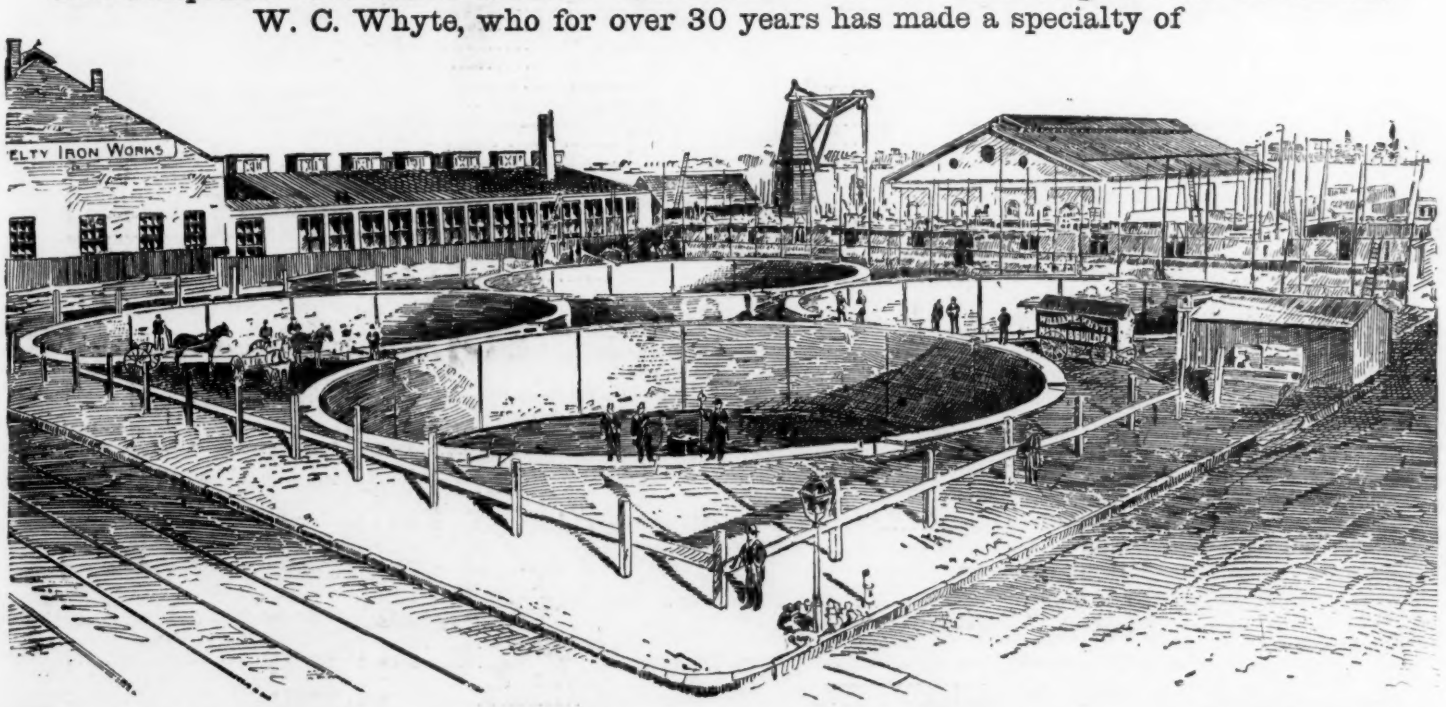

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Altrincham	600,000
Adelaide	600,000
Aldershot	200,000
Allegheny, U. S. A.	1,000,000
Ashton-under-Lyne	1,250,000
Amsterdam	1,500,000
"	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co	200,000
Altoona, U.S.A.	350,000
Buxton	250,000
Bradford	1,000,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
Bremen	150,000
Baltimore, U.S.A.	1,000,000
"	1,000,000
"	1,000,000
Balmain, N.S.W	125,000
Bishops Stortford	150,000
Blackpool	400,000
Brussels	1,250,000
"	1,250,000
"	750,000
"	1,250,000
Banbury	250,000
Birmingham	5,000,000
Birkenhead	2,500,000
Blackburn	1,500,000
Bochum	600,000
Burntisland	250,000
Boston, U.S.A.	2,000,000
Brisbane	1,500,000
"	300,000
Burton-on-Trent	1,500,000
Barcelona	350,000
Barking	100,000
Baerlien & Co	20,000
"	20,000
Bombay	400,000
Buffalo, U.S.A., Mutual	750,000
" **Citizen**	500,000
Brookline, U.S.A.	500,000
Bergen	350,000
Berlin	1,250,000
Bournemouth	1,000,000
Bridgeport, U.S.A.	500,000
Brunswick	300,000
Beck & Co., St. Louis	100,000
Barmen Rittershausen	600,000
Bexhill	125,000
Brooklyn, U.S.A.	1,000,000
"	1,000,000
" **Nassau**	1,000,000
Brunner, Mond & Co.	400,000
Cheltenham	2,000,000
Cannes	200,000
Croydon	1,500,000
Copenhagen	200,000
Clevedon	200,000
Columbus, U.S.A.	500,000
Cincinnati, "	1,500,000
" "	1,500,000
Chicago "	3,000,000
" "	1,000,000
" "	1,000,000
Chemnitz	1,000,000
Crewe	1,250,000
Colonial Gas Works Co	100,000
Cadiz	300,000
Charlottenburg	600,000
Dudley	750,000
Driffield	100,000
Dukenfield	500,000
Dover	750,000
"	1,000,000
Deal	200,000
Derby	1,500,000

	Capacity. Cubic feet per day.
Dublin	3,000,000
Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A.	350,000
Denver, "	500,000
" "	1,000,000
Dusseldorf	750,000
"	500,000
Dumfries	250,000
Dunedin, N.Z	400,000
Darlington	1,250,000
Detroit, U.S.A.	750,000
Edinburgh	1,500,000
"	2,000,000
Enfield	300,000
Essen	300,000
Elbing	150,000
Falmouth	150,000
Frankfort	300,000
Farnworth	400,000
Fenton	400,000
Friedenshutte	500,000
Furth	400,000
Freiburg	200,000
Goole	250,000
Glossop	300,000
Guildford	300,000
Gloucester	1,250,000
Gera	300,000
Grafton, N.S.W	100,000
Grieg	300,000
Georgetown, U.S.A.	250,000
Gluckauf	200,000
Heywood	600,000
Holywood	125,000
Huy	70,000
Harrow	250,000
Harrogate	250,000
Halstead	150,000
Heilbronn	200,000
Havana, Cuba	750,000
Hastings	1,500,000
Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
Hampton Wick	500,000
Heckmondwicke	500,000
Haverfordwest	100,000
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Hamm	200,000
Halle	400,000
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Ilkeston	300,000
Inverness	250,000
Ilkley	200,000
Ilford	100,000
Kingston-on-Hull	400,000
Kidderminster	750,000
Kidsgrove	100,000
Konigberg	1,000,000
King's Lynn	300,000

LONDON:—

The Gaslight and Coke Co.:	
Beckton	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000

LONDON—*Continued.*	Capacity. Cubic feet per day.
Shoreditch	2,500,000
Pancras	1,500,000
"	1,500,000
Pimlico	2,000,000
Nine Elms	3,000,000
"	3,000,000
South Metropolitan Co:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U. S. A.	1,000,000
Louisville "	1,500,000
Long Eaton	500,000
Lilie	900,000
"	450,000
"	750,000
"	250,000
"	250,000
Luckenwalde	330,000
Liegwitz	300,000
Lincoln, U. S. A.	250,000
Lawrence "	500,000
Lynn "	300,000
Lyons	1,500,000
Maidstone	1,000,000
Marseilles	1,500,000
"	1,500,000
Mons	500,000
Malines	250,000
Melbourne	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
Manchester	2,500,000
Middleton	400,000
Manley, N. S. W.	100,000
Minneapolis, U. S. A.	750,000
Magdeburg	300,000
Memphis, U. S. A	750,000
Nottingham	1,250,000
"	2,500,000
"	2,500,000
"	2,000,000
"	1,500,000
"	2,000,000
Newport, U.S.A.	430,000
Newmarket	150,000
Newark, U.S.A.	680,000
Northfleet	200,000
New York, U.S.A.	2,000,000
Nice	600,000
Newcastle, N. S. W.	200,000
Numea, "	100,000
Namur	250,000
Newark	350,000
Oldbury	500,000
Otley	200,000
Oswestry	250,000

	Capacity. Cubic feet per day.
Ober Schlesian	1,500,000
Otto & Co.'s Coke Works	1,500,000
Plymouth	2,000,000
Parramatta, N. S. W.	100,000
Prescott	150,000
Providence, U.S.A.	750,000
"	750,000
Plauen	300,000
"	300,000
Portsmouth	2,500,000
"	2,500,000
Pittsburgh, U.S.A.	1,500,000
Portland, "	560,000
Pawtucket, "	500,000
Quebec	250,000
Radcliffe	750,000
Rouen	250,000
Ramsgate	1,000,000
Reigate	200,000
Richmond, U.S.A.	250,000
Roxbury, "	500,000
Runcorn Soap Co.	20,000
Rockhampton, N. S. W.	125,000
Richmond	1,500,000
Reading	2,000,000
Reichenbach	200,000
Salford	1,750,000
"	1,750,000
"	1,750,000
Smethwick	750,000
Sydney, N. S. W.	1,000,000
"	1,000,000
"	2,500,000
"	50,000
"	50,000
Sunderland	1,500,000
St. Josephs, U.S.A	250,000
Spa	100,000
Sevenoaks	300,000
St. Petersburg	2,000,000
"	1,500,000
St. Louis, U.S.A.	2,000,000
"	2,000,000
"	1,000,000
Laclede	1,000,000
Silesian Coal Co.	600,000
San Francisco, U.S.A.	2,000,000
"	2,000,000
Sheepbridge Coal Co.	40,000
Stettin	200,000
Singapore	300,000
Sutton	500,000
Tonbridge	150,000
Tipton	400,000
Tottenham	1,000,000
Toledo, U.S.A.	750,000
Toronto	1,000,000
Uxbridge	300,000
Valparaiso	500,000
West Bromwich	1,000,000
Willenhall	250,000
Weston-super-Mare	500,000
Waltham	150,000
Wormwood Scrubs	300,000
Williamsburg, U.S.A.	600,000
"	600,000
Wellington	150,000
Warwick	300,000
Wheeling, U.S.A.	500,000
Walker	300,000
Westgate	100,000
Wilmington, U.S.A.	500,000
Windsor, N. S. W.	100,000
Wolverton	100,000
Wellington, N. Z.	250,000
Whitchurch	175,000
Washington, U.S.A.	2,000,000
Wallasey	750,000
Weimar	150,000
Wurzen	200,000
Worcester, U.S.A.	750,000
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Sioux Falls Gas Co.	Sioux Falls, Dak.
Dakota Gas and Fuel Co.	Grand Forks, Dak.
St. Johns Mutual Gas Co.	St. Johns, Mich.
Stillwater Gas Light Co.	Stillwater, Minn.
St. Paul Gas Light Co.	St. Paul, Minn.
Emporia Electric and Gas Light Co.	Emporia, Kas.
Van Wert Gas Light Co.	Van Wert, Ohio.
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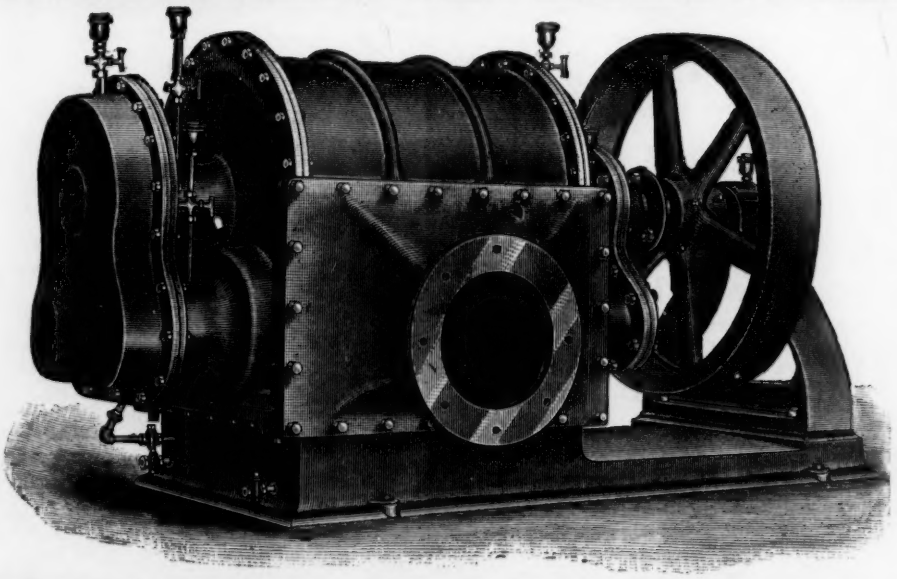

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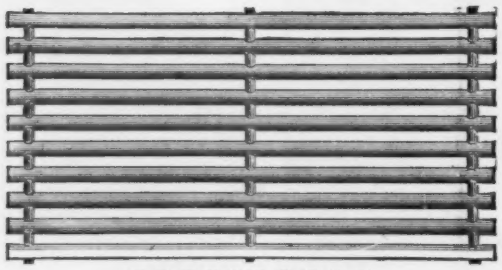

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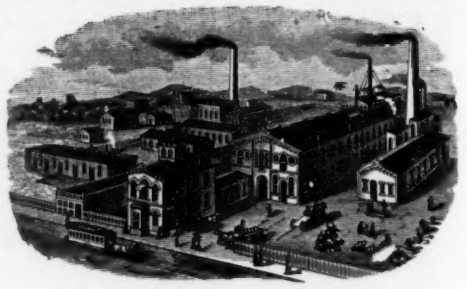

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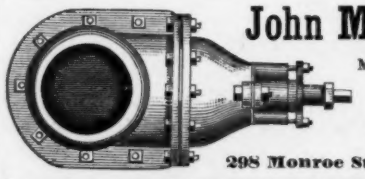

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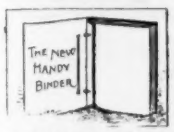

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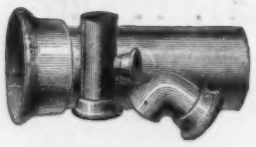

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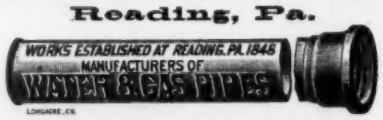

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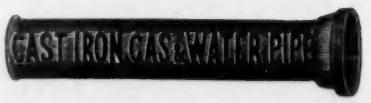

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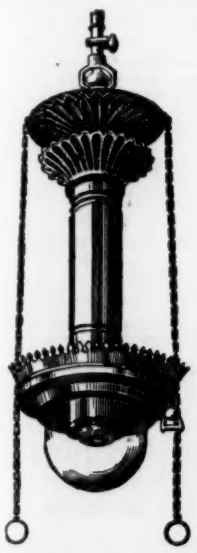

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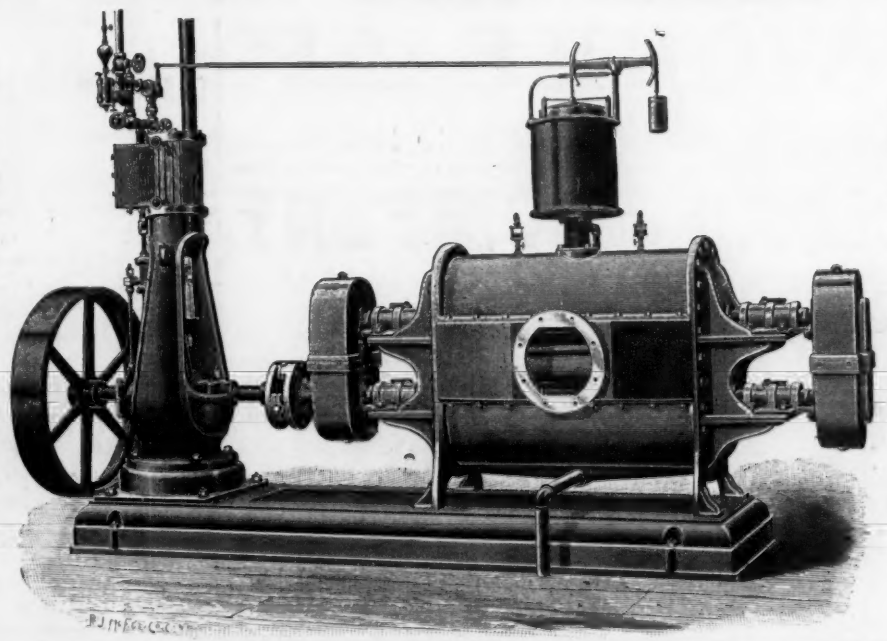

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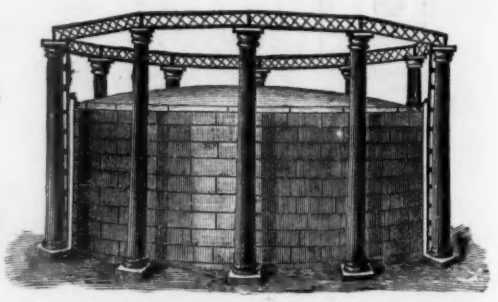

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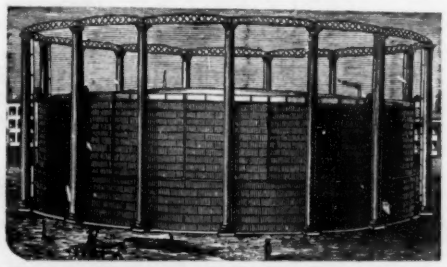

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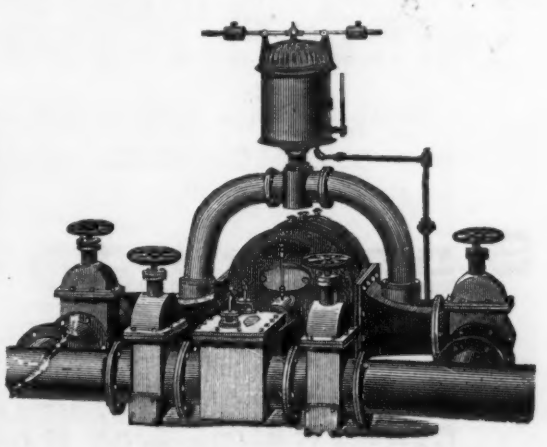

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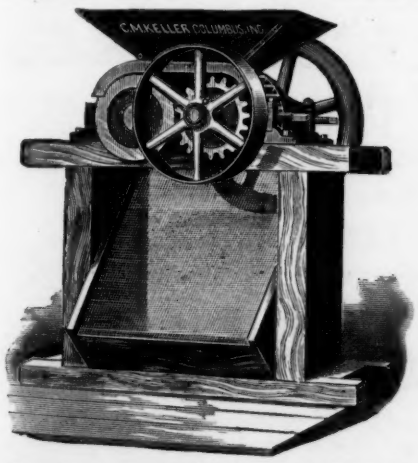

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4,500 lbs. Indiana nut and slack, at $1.30 per ton	$2 93
Engineer, one night, at $50 per month	1 67
Trimmer, one day, at $40 per month	1 33
Superintendent or Electrician, one day, at $50 per month	1 66
Waste, etc., one day, at $20 per year	05
Water rent, one day, at $40 per year	11
Wheeling coal and removing ashes, at $4 per week	58
100 pairs carbons, at $18.50 per 1000	1 85
One pint cylinder oil, at 60 cents per gallon	07
One quart engine and dynamo oil, at 50 cents per gallon	13
Total	$10 38

50-H.P. OTTO GAS ENGINE, Running a Plant of Fifty 2000 C.P. Arc Lamps 12 Hours.	
9,200 cu. ft. gas, at 42 cts. per M. (for cost of gas see items below)	$3 86
Engineer not needed; engine is in care of Electrician or Supt.	....
Trimmer, one day, at $40 per month	1 33
Superintendent or electrician, one day, at $50 per month	1 66
Waste, etc., one day, at $20 per year	05
Water rent dispensed with (cooling water used over and over)	....
Handling of coal included in cost of gas	....
100 pairs carbons, at $18.50 per 1,000	1 85
One pint cylinder oil, at 60 cents per gallon	07
One quart engine and dynamo oil, at 50 cents per gallon	13
Total	$8 95

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